# 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. (EC/ECIOT)
## (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* | | | | |
| BTEC301 | DCC | Advanced Programming Concepts | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 4 | 5 |

**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. Understand principles of object-oriented programming paradigm including abstraction, encapsulation, inheritance, and polymorphism.
2. Understand Java as a dynamic programming language.
3. Solve computing problems using advanced programming techniques.
4. Apply various system libraries for problem solving.

**Course Outcomes (COs):**

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

1. Explain the object-oriented concepts.
2. Write programs using object-based programming techniques including classes, objects and inheritance.
3. Demonstrate understanding of Java by implementing test cases.
4. Create, debug, and run Java programs using the Java SDK environment.

**Syllabus**

**UNIT I** **9 Hrs.**

**Introduction**

Review of Object-oriented concepts, Features of Java, Java Environment setup, JVM, JRE and JDK, Java Classes and Objects, Basic syntax, Basic Data Types, Variable Types, Basic Operators, Loop Control, Decision Making, Arrays.

**UNIT II** **9 Hrs.**

**Java Fundamentals**

Constructors, Methods and Variables, Method Overloading, Use of this and static keyword in Java, Static and Instance Initializer Blocks, Inner and Nested classes, Wrapper Classes, Autoboxing and Unboxing, Enumerations, Garbage collection.

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**UNIT III**

**Inheritance and Polymorphism** **9 Hrs.**

Understanding Inheritance, Types of Inheritance, Use of super keyword in Java, Polymorphism, Types of polymorphism, Method Overloading, Constructor Overloading, Method Overriding, Access Specifier, Packages, Interfaces, Abstract classes.

**UNIT IV**

**Exception Handling and Multithreading** **9 Hrs.**

Exceptions and errors, Exception hierarchy: Checked Unchecked exceptions, Types of Exception, Exception Handling using try, catch, finally, throw, throws, User Defined Exceptions.
Understanding Threads, Need of Multi-Threaded Programming, Thread Life cycle, Priorities and scheduling, Thread Synchronization, Inter Communication of Threads, Deadlock.

**UNIT V**

**Java Library** **8 Hrs.**

Java String class, String Buffer, String Builder, String Handling. Exploring java.lang, Object class. Exploring java.util package. Exploring java.io package.

**Text Books:**


1. Herbert Schildt, "Java: The Complete Reference", 11th Edition, McGraw-Hill Education, 2018.
2. E Balagurusamy, "Programming with Java: A Primer", 6th Edition, McGraw Hill Education, 2019.


**References:**


1. T. Budd, "Understanding Object-Oriented Programming with Java", Pearson Education, 2nd Edition, 2002.
2. J. Nino, F. A. Hosch, "An Introduction to programming and Object-Oriented design using Java", John Wiley & Sons, 3rd Edition 2002.
3. Y. Daniel Liang, " Introduction to Java programming", Pearson Education, India, 7th Edition, 2010.
4. Cay Horetmann, Gary Cornelll, "Core Java 2", Volume II-Advanced Feature", 7th Edition, Pearson Education, 2013


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**List of Experiments:**

1. Write a program to show concept of Class in Java.
2. Write a program to show Scope of Variables.
3. Write a program showing Type Casting.
4. Write a program to demonstrate use of different types of constructors
5. Write a program for inheritance.
6. Write a program in java to demonstrate access modifiers in java.
7. Write a program showing different types of Polymorphism.
8. Write a program for Exception Handling in Java.
9. Write a Multithreaded program in Java.
10. Write a program for string handling using different methods.

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## Choice Based Credit System (CBCS) in the Light of NEP-2020
## B.Tech. in Electronics and Instrumentation
## (Common to EI/MX/EE/EX/RW)
## (2021-2025)

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| BTEI401 | DCC | Microprocessor and Microcontroller | 60 | 20 | 20 | 30 | 20 | 3 | 1 | 2 | 5 |

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**Course Educational Objectives (CEOs):**

1. To gain knowledge of basics of Microprocessor & Microcontroller & Learn development of assembly language programs.
2. To learn the programming skills of 8086 Microprocessor & 8051 Microcontroller.
3. To learn the interfacing of external devices (LED, LCD, ADC, DAC) with the microcontroller 8051.

**Course Outcomes (COs):**

The students will be able to:

1. Apply the concept of buses, Microprocessor & Microcontroller architecture and interrupts.
2. Interface memory and I/O devices with 8051 Microcontroller
3. Program assembly language / C programming of 8051 & 8086.
4. Design Microcontroller based small system
5. Interface 8051 with LED, LCD, ADC, DAC etc.

**Syllabus**

**UNIT I** **8Hrs.**

**Introduction to 8086 Microprocessor**

Overview of 8086 microprocessor. Architecture of 8086, Signals and pins of 8086 microprocessor, Concept of Memory Segmentation in 8086. Maximum Mode , Minimum Mode, Timing diagram, Comparative study of Salient features of 8086, 80286 & 80386.

**UNIT II** **10Hrs.**

**Microprocessor 8086 programming**

8086 Instructions set . Addressing mode of 8086, Assembly directives. Stack , Interupts of 8086, Assembly language programs of 8086.

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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 in8051 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. 1.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 operationand 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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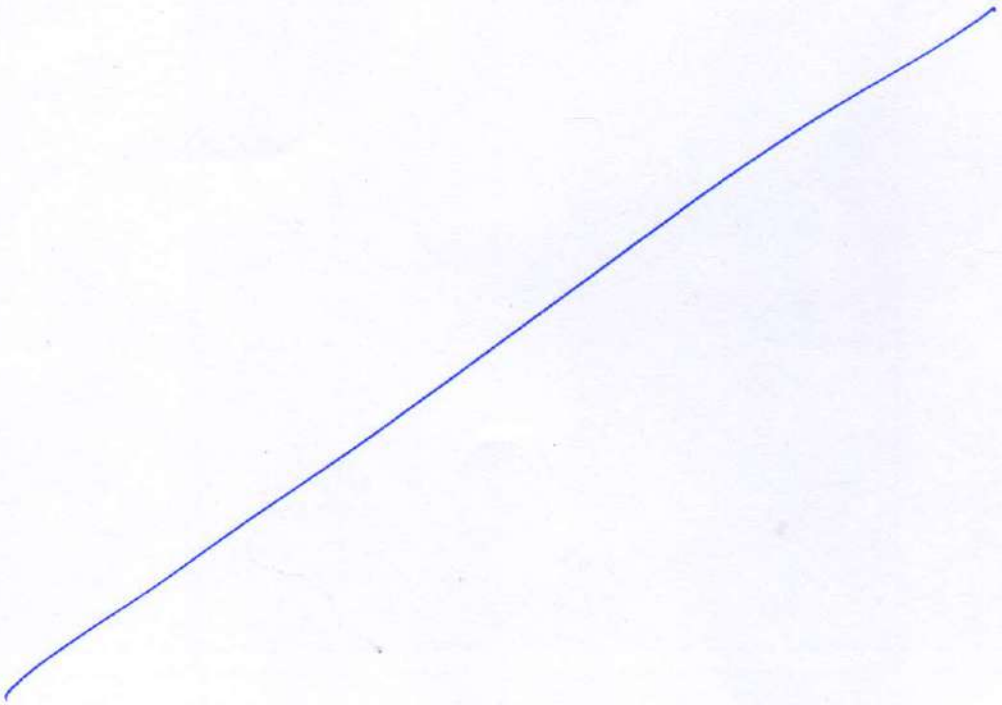
10. 8051 Assembly language programming for
    a. code conversions
    b. Timers in different modes.
    c. I/O port programming in embedded C.
    d. Programming of LCD in embedded C.



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## ML307 ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY

| SUBJECT CODE | CATEGORY | SUBJECT NAME | TEACHING & EVALUATION SCHEME | | | | | | | | |
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| ML-307 | Compulsory | Environmental Management and Sustainability | 60 | 20 | 20 | 0 | 0 | 4 | 0 | 0 | 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.

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## 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

**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 1V: 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

**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

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**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 Billon: 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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| **BTME401** | DCC | **FLUID MECHANICS** | 60 | 20 | 20 | 30 | 20 | 3 | 0 | 2 | **4** |

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**Course Educational Objectives (CEOs):**

To introduction with (A) Fluid and its properties, (B) behavior of fluid under various conditions, (C) Applications.

**Course Outcomes (COs):**

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

1. Understand the fundamentals of fluid mechanics.
2. Understand basics of compressible flow.
3. Understand fundamentals of flow through pipes.
4. Understand statics, dynamics and various approaches to fluid mechanics.

## Syllabus

**Unit – I** **(9 Hrs)**

**Flow and Fluid Properties:** Viscosity, relationship between stress and strain-rate for Newtonian fluids, incompressible and compressible flows, differences between laminar and turbulent flows. Hydrostatics forces: Buoyancy and floatation, manometer, forces on submerged and floating bodies, stability conditions.

**Unit – II** **(9 Hrs)**

**Kinematics:** Types of fluid flow, rate of flow or discharge continuity equation, velocity and acceleration, velocity potential function and stream function, types of motion, vortex flow.
**Ideal flow:** Uniform flow, source flow, sink flow, free vortex flow.

**Unit – III** **(10 Hrs)**

**Differential Analysis:** Differential equations of mass and momentum for incompressible flows, inviscid - Euler equation and viscous flows - Navier-Stokes equations, Bernoulli's equation from Euler's equation and assumptions, concept of fluid rotation, vorticity, stream function, Exact solutions of Navier-Stokes equation for Coquette Flow and Poiseuille flow, Orifices and mouthpieces: classifications of and flow through orifice, hydraulic coefficients, experimental determination of hydraulic coefficients, classification and flow through convergent and divergent mouthpiece.

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**Unit – IV** **(9 Hrs)**

**Dimensional Analysis:** Introduction, secondary or derived quantities, methods of dimensional analysis, model analysis, similitudes-types of similarities, dimensionless numbers, models law and Concept of geometric, kinematic and dynamic similarity, some common non-dimensional parameters and their physical significance: Reynolds number, Froude number and Mach number**.**
**Internal Flows:** Fully developed pipe flow, various losses in pipe flow, empirical relations for laminar and turbulent flows: friction factor and Darcy-Weisbach relation.

**Unit-V** **(8 Hrs)**

**Prandtl Boundary Layer Equations:** Concept and assumptions, qualitative idea of boundary layer and separation, streamlined and bluff bodies, drag and lift forces. Flow measurements: Basic ideas of flow measurement using venturimeter, Pitot - static tube and orifice plate.

**Text and Reference Books:**


1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, S.K. kataria & Sons, 2015.
2. Fluid Mechanics and Hydraulic Machines by R.K. Bansal, Laxmi Publications, 2016.
3. Fluid Mechanics and Hydraulic Machines by R.K. Rajput, S. Chand & Co., 2017.
4. Fluid Mechanics by F. M. White, 5th ed., McGraw-Hill, New York, 2007.
5. Fundamentals of Fluid Mechanics by Munson, Willey India, 2012.
6. Fluid Mechnaics by A.K. Mohanty, PHI Learning Pvt. Ltd., 2011
7. Textbook of Fluid Mechanics by Suparna Mukhopadhyay, CBS Pub. 2015.


**List of Experiments**

1. To understand pressure measurement procedure and related instruments/devices.
2. To study meta-centric height of floating body.
3. Verification of Bernoulli's Theorem.
4. To study the velocity of flow using Pitot tube.
5. To determine the Coefficient of discharge through different flow meters. (Any two out of Orifice meter, Venturimeter and Nozzle meter.)
6. To determine the different types of flow Patterns by Reynolds experiment.
7. To study the Friction factor for the different pipes.
8. To study the loss coefficients for different pipe fittings.

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# 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. in Electronics and Instrumentation
## (Common to EI/MX)
## (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* | | | | |
| **BTEI503** | **SEC** | **Virtual LAB** | 0 | 0 | 0 | 30 | 20 | 0 | 0 | 2 | 1 |

**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):**

1. To familiarize the student with introducing and exploring LABVIEW software.
2. To enable the student on how to approach for solving engineering problems using simulation tools.
3. To provide a foundation in use of this software for real time applications.

**Course Outcomes (COs):**

The students will be able to

1. Express programming & simulation for engineering problems.
2. Use virtual instruments on Labview Environment.

**List Of Experiments:**

1. To study about Labview.
2. Demonstration of Virtual Instruments.
3. Perform basic arithmetic and Boolean operations using Labview.
4. Find the sum of 'n' numbers using FOR loop and while loop and compare them.
5. Find the maximum and minimum variable from an array.
6. Merging of Analog signal at Labview.
7. Design calculator a using Labview.
8. Design a cube using Labview and analyze the graphical changes by changing the values in array.
9. Demonstration of simulink in Labview.
10. Design a minor project.

**Text Books:**


1. Dr. S. Sumathi,; Prof. P. Surekha ,"LabVIEW based Advance Instrumentation" , Springer; 1st edition 2007 .
2. Dr. S. Sumathi, Surekha P, "Virtual Instrumentation using LABView", ACME Learning, India, ISBN: 1234567175093, 01.12.2010, March 2011. , ISBN-13.


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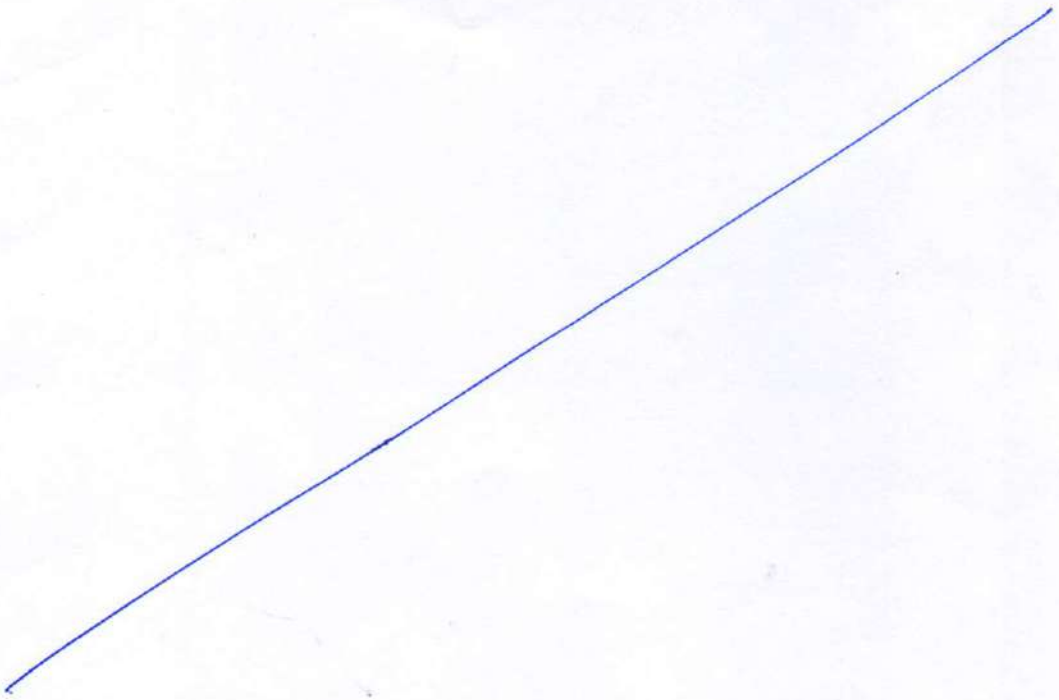
**References:**


1. Gary Johnson, "Lab view graphical programming", II Ed., McGraw Hill, 2006.
2. Lisa K Wells & Jeffrey Travels, "Lab view for everyone", Prentice Hall, 1997.

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| BTEI404 | SEC | PLC LAB | 0 | 0 | 0 | 30 | 20 | 0 | 0 | 2 | 1 |

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**Course educational objectives(CEOs)**

1. To provide knowledge levels needed for PLC programming and operating.
2. To make the students how devices to which PLC input and output modules are Connected.
3. To train the students to create ladder diagrams from process control descriptions.
4. To make the students understand various types of PLC registers.
5. Apply PLC Timers and Counters for the control of industrial processes.
6. To make the students understand PLC functions, Data Handling Function.
7. To train the students to develop a coil and contactl control system to operate a basic robot and analog PLC operations.

**Course outcomes(Cos)**

At the end of the course student will have ability to

1. Ability to gain knowledge on Programmable Logic Controllers.
2. Will understand different types of Devices to which PLC input and output modules are Connected.
3. To provide the knowledge about understand various types of PLC registers.
4. Able to create ladder diagrams from process control descriptions.
5. Ability to apply PLC timers and counters for the control of industrial processes.
6. Able to use different types PLC functions, Data Handling Function.

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**List of Experiments:**

1. Introduction of mechatronics and study of elements of mechatronics systems.
2. To study and analysis of Mechatronics products and systems in manufacturing.
3. To simulate the PLC Ladder logics through Siemens PLC kit and Step-7 Micro/ Win
   1. software.
4. To perform and verify given Boolean expressions using ladder logic on PLC simulation software kit.
5. To perform and verify half adder and full adder using ladder logic on PLC simulation software kit.
6. To perform and verify half subtractor and full subtractor using ladder logic on PLC simulation software kit.
7. Design ladder logic for MUX (4x1) on PLC simulation software kit.
8. Design a ladder logic for DEMUX (1x4) on PLC simulation software kit.
9. Design ladder logic for Encoder on PLC simulation software kit.
10. Design ladder logic for Decoder on PLC simulation software kit.

**Text Books:**


1. Curtis E. Johnson," Process Control Instrumentation Technology", Prentice hall of India, 8th Edition 2005.
2. W.Bolton ," Programmable Logic Controllers", Newness, sixth edition,2015.


**References:**


1. Garry Dunning ,"Introduction to Programmable Logic Controllers ",third edition, Thomson, 2005.
2. A.E. Fitzerald ,C.Kingsley and S.D Umans, "Electric Machinery", -McGraw Hill Int. sixth Edition, 2017.


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