B. Tech. (Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT 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				
BTEI501		Digital Signal Processing	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; **Q/A** – Quiz/Assignment/Attendance, **MST** Mid Sem. Test.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives (CEOs):

1. Course will introduce the basic concepts and techniques for processing signals on a computer.
2. Introduce various methods in DSP, including digital filter design, transform-domain processing and importance of Signal Processors.
3. The course emphasizes intuitive understanding and practical implementations of the theoretical concepts.

Course Outcomes (Cos):

Student will be able to:

1. Understand the meaning and implications of the properties of systems and signals.
2. Represent discrete-time signals analytically and visualize them in the time domain.
3. Implement & design any digital filters using MATLAB.
4. Use analog and digital filter design techniques.

Syllabus

Unit I **8hr**

Introduction to DSP, Fourier Series-representation of periodic signals and a periodic signal, Discrete Fourier Series (DFS), Discrete Fourier Transform (DFT), Properties of DTFT-DFT, Relation between DFT and other transform, Linear and Circular Convolution, Linear Convolution using the DFT.

Unit II **8hr**

Computation of the Discrete Fourier Transform: Goertzel algorithm, Radix-2 FFT algorithms: Decimation in time and Decimation in frequency, FFT algorithm for N composite number, Chirp Z transforms (CZT).

Unit III **8hr**

Flow Graph and Matrix Representation of Digital Filters: Block diagrams & Signal flow graph

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

representation of Digital network, Matrix Representation, Basic network structures and there Realization for IIR and FIR systems, Telligen's theorem for Digital filters and its applications.

Unit IV **10hr**

Analog filter design butterworth and Chebyshev approximations, IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives. Linear phase FIR filter using windowing techniques, Symmetric and Anti symmetric FIR filters.

Unit V **7hr**

Multirate Signal Processing: Decimation, Interpolation, Sampling rate conversion by rational factor, Adaptive filters: Introduction, Basic principles of Forward Linear Predictive filter and applications, Introduction to DSP Processors, Fixed point Digital Signal Processors, TMS320C2000 series DSP-Architecture & applications.

Text Books:

1. John G. Proakis, Dimitris G. Manolakis, "Digital Signal Processing: Principles, algorithms and applications" Fourth edition 2007, Pearson Prentice Hall.
2. S. Salivahanan, C. Gnanpriya, " Digital Signal processing", McGraw Hill Second edition 2011.

References:

1. A.V. Oppenheim, Ronald W. Schafer ," Digital Signal Processing", Pearson Publication ,First Edition , 2015
2. Sanjit K. Mitra, Sanjit Kumar Mitra "Digital Signal Processing: A Computer-based Approach" McGraw-Hill, 2011

List of Experiments:

1. Generation, analysis and plots of discrete-time signals.
2. Implementation of operations on sequences (addition, multiplication, scaling, shifting, folding etc).
3. Computation and plot of DTFT of sequences, verification of properties of DTFT.
4. Computation and plot of DFT of sequences, verification of properties of DFT.
5. Computation and plots of linear convolution of two sequences.
6. Computation and plots of circular convolution of two sequences.
7. Computation of radix-2 FFT- Decimation in time and Decimation in frequency.
8. Implementation of IIR and FIR filter structures (direct, cascade, parallel etc).
9. Implementation of various window design techniques (Rectangular, Bartlett).
10. Implementation of various window design techniques (Hann, Hamming).

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

B. Tech. (Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT 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*				
BTEI502		Fiber Optic Instrumentation	60	20	20	0	0	3	0	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; **Q/A** – Quiz/Assignment/Attendance, **MST** Mid Sem. Test.

***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 give the knowledge of Optical Instrumentation system & develop the understanding of optical communication system to the students.
2. To give the student a clear idea about the various strategies of optical fiber modes.
3. To make them aware of latest technologies and standards use in optical communication.
4. To give the student a clear idea about optical networks & concept of protocols.
5. To give the knowledge of different techniques used in optical measurement systems

Course Outcomes (COs):

Student will be able to

1. Use the optical couplers and sensors.
2. Demonstrate communication in different modes.
3. Apply concept of optical switching.
4. Solve various optical networks and techniques.
5. Use various types of optical source like LED, LASER etc.

Syllabus

UNIT I **8hr**

Introduction to vector nature of light, Propagation of light, Propagation of light in a cylindrical dielectric rod, ray model, wave model. Theory of image formation, Comma, acclamation, distortion, Chromative aberration

UNIT II **10hr**

Different types of optical fibers, model analysis of a step index fiber. Signal degradation on optical fiber due to dispersion and attenuation.

UNIT III **10hr**

Optical fiber in instrumentation, optical fibers as sensors, modulation techniques for sensors fiber optic power measurement. Stabilized calibrated light sources, end-to-end measurement of fiber losses, optical signal processing.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

UNIT IV **8hr**

Optical power meters, optical attenuators, optical spectrum analyzer, measurement techniques like optical time domain reflectometry, (OTDR), attenuation measurements

UNIT V **8hr**

Optical Sources & detectors: LED and LASERS, photo detectors, pin detectors detector responsitivity, noise, optical receivers. Integrated optical devices

Text Books:

1. John M. Senior, Optical Fiber Communications- Principles and Practice, 2nd Edition, Pearson Education, 2014.
2. Gerd Keiser, Optical Fiber Communication 4th edition, Tata McGraw-Hill Education, 2014.

References:

1. Ajoy Ghatak, Optics, 4th edition Tata McGraw-Hill Education, 2012.
2. David A. Krohn &Trevor W. MacDougall, Fiber Optic Sensors: Fundamentals and Applications, 4th Edition, SPIE press book, 2015.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Electrical Engineering)

SEMESTER V

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE 503		CONTROL SYSTEM ENGINEERING	3	1	2	5	60	20	20	30	20

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 Objectives:

The course will provide understanding of control system and mathematical modeling of the system

Course Outcomes:

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

1. Demonstrate the understanding of basic element and modeling of the control system.
2. Analyze the stability in time domain and frequency domain
3. Design the controller and compensators for the system

Syllabus:

UNIT I **8 Hrs**

Introduction: Basic Elements of Control System, Open loop and Closed loop systems, Differential equation, Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems, Block diagram reduction Techniques, Signal flow graph, Constructional and working concept of ac servomotor.

UNIT II **8 Hrs**

Time Domain Analysis: Standard test signals ,Time response of first order systems ,Characteristic Equation of Feedback control systems, Transient response of second order systems ,Time domain specifications , Steady state response , Steady state errors and error constants , P, PI, PD and PID Compensation

UNIT III **8 Hrs**

Stability Analysis and Root locus: The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability.The root locus concept - construction of root loci-effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT IV **8 Hrs**

Frequency domain Analysis: Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots, Nyquist Plots,Stability analysis. Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Electrical Engineering)

SEMESTER V

UNIT V **8 Hrs**

State Space Analysis of Continuous Systems: Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability.

Text Books:

1. I.J.Nagrath and M.Gopal," Control System Engineering", New Age International Pu blishers, 5th Edition, 2008.
2. Richard C Dorf; Robert H Bishop, "Modern control system", Pearson Education, 13th Edition, 2017.

References Books:

1. M F Golnaraghi and Benjamin C Kuo, "Automatic control systems", New York McGraw-Hill Education, 9th Edition, 2017.
2. M.Gopal, Digital Control and State Variable Methods, Tata McGraw- Hill 4th Edition, 2014.
3. Joseph J DiStefano, Allen R Stubberud and Ivan J Williams , Schaum's Outline Series, "Feedback and Control Systems", Tata McGraw- Hill, 2nd Edition 2014.
4. John J.D'azzo & Constantine H.Houpis, 'Linear control system analysis and design', Tata McGraw-Hill., 4th Edition 2000 .

List of Practicals:

1. Perform step response of a transfer function
2. Perform impulse response of a transfer function
3. Perform ramp response of a transfer function
4. Analyze torque speed characteristics and determine the transfer function of a DC servomotor.
5. Analyze characteristics of a small AC servomotor and determine its transfer function.
6. Perform the transient and frequency response of a second order network.
7. Perform the performance of various types of controllers used to control the temperature of an oven.
8. Draw nyquist plot from a transfer function
9. Draw root locus from a transfer function
10. Draw bode plot from a transfer function

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of Program: Bachelor of Technology in Electronics & Communication with Specialization in IOT

SUBJECT CODE	Catego-ry	SUBJECT 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*				
BTEC504	EC	CMOS VLSI Design	60	20	20	30	20	3	1	2	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):

To inculcate the concepts of CMOS VLSI Design and relate its importance in today's scenario.
To impart knowledge based on design of analog as well as digital VLSI circuits.

Course Outcomes (COs):

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

1. Demonstrate the working and device physics related to CMOS.
2. Design circuits based on combinational logic.
3. Design analog circuits related to CMOS.
4. Draw stick diagrams and design layouts for different devices and circuits.

Syllabus

UNIT I **9 Hrs.**

Introduction / Orientation: VLSI Design flow, Y- Chart, Structured design strategies: Hierarchy, Regularity, Modularity and Locality. Design Methods: Microprocessor/DSP, Programmable Logic, GA and SOG, Cell based design, Full custom Design; Platform based design/SOC. Design Economics.

UNIT II **10 Hrs.**

MOS Transistor Theory: MOS device equations, Second order effects: Mobility degradation and velocity saturation, Body effect, Short channel effects, Narrow width effects. CMOS Inverter DC Characteristics-VI Characteristics, Beta Ratio effects, Noise Margin. Scaling - Transistor Scaling, Supply Voltage Scaling, Interconnect Scaling.

UNIT III **9 Hrs.**

Delay and Power Considerations: Delay Definitions, Transient response, RC Delay model, Linear Delay Model. CMOS Logic implementations and Logical Effort. Power Definitions, Dynamic Power, Static Power, Latch up triggering and prevention.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

UNIT IV **8 Hrs.**

CMOS Processing Technology: Wafer Formation, Photolithography, N-well process, Twin tub process, Stick Diagrams, layout design rules, CMOS process enhancements.

UNIT IV **9 Hrs.**

Analog CMOS design: Introduction to analog design, Current Mirror, Single stage amplifier: Common source with diode, resistive and current source connected load, Source follower, Differential amplifiers. Frequency response: Miller effect, Association of Poles with nodes, common source stage and source followers.

Text Books:

1. Neil H.E. Weste, David Money Harris, "CMOS VLSI Design, A circuits and systems perspective", 4th Edition, Pearson, 2010.
2. Neil H.E. Weste, David Money Harris Ayan Banerjee, "CMOS VLSI Design, A circuits and systems perspective", 4th Edition, Pearson Education, 2010.
3. Behzad Razavi, "Design of Analog CMOS Integrated Circuits", Tata McGraw-Hill Education, 2016.
4. Peter Van Zant, "Microchip Fabrication, A Practical Guide to Semiconductor Processing", 6th Edition, McGraw Hill Professional, 2013.

References:

1. Sung Mo Kang, Yusuf Lebliabici, "CMOS Digital Integrated Circuits: Analysis and Design", 4th Edition, Tata McGraw Hill, 2015.
2. Douglas A. Pucknell, Kamran Eshraghian, "Basic VLSI Design",3rd Edition, Prentice Hall, 1994.
3. S. M. Sze, VLSI Technology, 2nd Edition, Tata McGraw-Hill Education, 2003.

List of Experiments:

1. Introduction to layout EDA tools and Technologies.
2. Study of Stick Diagrams and Euler's Path.
3. Layout Design of Resistors, Capacitors and MOSFETS.
4. Layout Design for Logic gates.
5. Layout Design for Half adder and Full adder.
6. Layout Design for Multiplexer.
7. Layout Design for Encoders and Decoders.
8. Layout Design for SRAM.
9. Layout Design for Flip Flops.
10. Layout Design for 4-Bit Multiplier.
11. Study of different packages and Bonding pads.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCS403	UG	Data Structure and Algorithms	3	1	2	5	60	20	20	30	20

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 Objectives:

1. To understand efficient storage mechanisms of data for an easy access.
2. To design and implementation of various basic and advanced data structures.
3. To introduce various techniques for representation of the data in the real world.
4. To develop application using data structures.
5. To understand the concept of protection and management of data.

Course Outcomes:

Upon the completion of the course, students will be able to:

1. Get a good understanding of applications of Data Structures.
2. Develop application using data structures.
3. Handle operations like searching, insertion, deletion, traversing mechanism etc.on various data structures.
4. Decide the appropriate data type and data structure for a given problem.
5. Select the best algorithm to solve a problem by considering various problem characteristics, such as the data size, the type of operations, etc.

Syllabus:

UNIT I

Introduction: Overview of Data structures, Types of data structures, Primitive and Non Primitive data structures and Operations, Introduction to Algorithms & complexity notations. Characteristic of Array, One Dimensional Array, Operation with Array, Two Dimensional Arrays, Three or Multi-Dimensional Arrays, Sparse matrix, Drawbacks of linear arrays. Strings, Array of Structures, Pointer and one dimensional Arrays, Pointers and Two Dimensional Arrays, Pointers and Strings, Pointer and Structure.

UNIT II

Linked List: Linked List as an ADT, Linked List Vs. Arrays, Dynamic Memory Allocation & De-allocation for a Linked List, Types of Linked List: Circular & Doubly Linked List. Linked List operations: All possible insertions and deletion operations on all types of Linked list Reverse a Single Linked List; Divide a singly linked list into two equal halves, Application of Linked List.

Chairperson
Board of Studies
(Computer Science & Engineering,
Information Technology & Computer Applications)

Joint Registrar

UNIT III

Stack: The Stack as an ADT, Stack operation, Array Representation of Stack, Link Representation of Stack, Application of stack – Recursion, Polish Notation . Types of Recursion, problem based on Recursion: Tower of Hanoi

The Queue :The Queue as an ADT, Queue operation, Array Representation of Queue, Linked Representation of Queue, Types of Queue :Circular Queue & Dequeue, Introduction of Priority Queue, Application of Queues.

UNIT IV

Tree: Definitions and Concepts of Binary trees, Types of Binary Tree, Representation of Binary tree: Array & Linked List. General tree, forest, Expression Tree. Forest and general tree to binary tree conversion. Binary Search Tree Creation, Operations on Binary Search Trees: insertion, deletion & Search an element, Traversals on Binary SEARCH TREE and algorithms. Height balanced Tree: AVL, B-Tree, 2-3 Tree, B+Tree: Creation, Insertion & Deletion.

Graph: Definitions and Concepts Graph Representations: Adjacency MATRIX, Incidence matrix, Graph TRAVERSAL (DFS & BFS), Spanning Tree and Minimum Cost Spanning Tree: Prim's & Kruskal's Algorithm.

UNIT V

Sortings: Sorting Concept and types of Sorting, Stable & Unstable sorting. Concept of Insertion Sort, Selection sort, Bubble sort, Quick Sort, Merge Sort, Heap & Heap Sort, Shell Sort & Radix sort. Algorithms and performance of Insertion, selection, bubble, Quick sort & Merge sort.

Text Books:

1. Ashok N. Kamthane, "Introduction to Data structures", 2nd Edition, Pearson Education India,2011.
2. Tremblay & Sorenson, "Introduction to Data- Structure with applications", 8th Edition, Tata McGrawHill,2011.
3. Bhagat Singh & Thomas Naps, "Introduction to Data structure", 2nd Edition, Tata Mc-GrawHill 2009.
4. Robert Kruse, "Data Structures and Program Design",2nd Edition,PHI,1997.
5. Lipschutz Seymour,"Data structures with C" ,1st Edition ,Mc- GrawHill,2017.

References:

1. Rajesh K. Shukla ,Data Structures Using C & C++, Wiley-India 2016.
2. ISRD Group ,Data Structures Using C, TataMcGraw-Hill 2015.
3. E. Balagurusamy ,"Data Structure Using C" ,Tata McGraw-Hill 2017.
4. Prof. P.S. Deshpande, Prof. O.G. Kakde, C & Data Structures, Charles River Media 2015 .
5. Gav Pai, Data Structures, Tata McGraw-Hill, 2015.

List of Practical:

Chairperson
Board of Studies
(Computer Science & Engineering,
Information Technology & Computer Applications)

Joint Registrar

1. To develop a program to find an average of an array using AVG function.
2. To implement a program that can insert, delete and edit an element in array.
3. To implement an algorithm for insert and delete operations of circular queue and implement the same using array.
4. Write a menu driven program to implement the push, pop and display option of the stack with the help of static memory allocation.
5. Write a menu driven program to implement the push, pop and display option of the stack with the help of dynamic memory allocation.
6. Write a menu driven program to implementing the various operations on a linear queue with the help of static memory allocation.
7. Write a menu driven program to implementing the various operations on a linear queue with the help of dynamic memory allocation.
8. Write a menu driven program to implement various operations on a linear linked list.
9. Write a menu driven program to implement various operations on a circular linked list
10. Program for implementation of Bubble sort
11. Program for Insertion sort
12. Program for Merge Sort
13. Program to implement Heap sort
14. Program to implement Quick sort
15. Program to Construct a Binary Search Tree and perform deletion, inorder traversal on it
16. To develop an algorithm for binary tree operations and implement the same.
17. To design an algorithm for sequential search, implement and test it.
18. To develop an algorithm for binary search and perform the same.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

B. Tech.(Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT 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*				
BTEI515		Data Communication	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; **Q/A** – Quiz/Assignment/Attendance, **MST** Mid Sem. Test.

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

Course Objectives(CEOs):

The purpose of this subject is to cover the underlying concepts and techniques used in Data Communication. In this subject we discuss various principles, standards for communication over different type of Communication Media

Course Outcomes(COs):

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

1. List and describe various data communication protocols.
2. List and describe various networking standards.
3. Describe alternative networking approaches and topologies.
4. Describe various important hardware devices used in networking.

Syllabus

Unit I **8Hrs**

Introduction to data communication: Components, bit rate, baud rate, Data transmission– Parallel and serial transmission, Synchronous and Asynchronous transmission, line configuration - Point to point and point to multipoint configuration, topology, transmission modes.

Unit II **7Hrs**

OSI reference model, TCP/IP reference model, DTE-DCE interface, interface standards, modems, cable modem, X.21 Modem, FDDI, IPV4 and IPV6.

Unit III **8Hrs**

Congestion control, CSMA/CD, Ethernet, digital subscriber line – ADSL, SDSL, VDSL. Plesiochronous digital hierarchy (PDH), Synchronous digital hierarchy (SDH), Terminal handling & polling, Handshaking, X.25.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Unit IV **8Hrs**

Switching techniques- Circuit, Packet and Message switching, Types of error- single bit error, burst error, Error detection- Vertical redundancy check, Longitudinal redundancy check, Cyclic redundancy check, error correction- Hamming code, Integrated services digital network (ISDN), ISDN services, digital signals, digital to digital encodings.

Unit V **7Hrs**

RJ-45, BNC Connector, Network interface card, ARQ, Sliding Window protocol, Connecting Devices: Active and Passive Hubs, Repeaters, Bridges, Two & Three layer switches & Gateway, Asynchronous transfer mode (ATM).

Text Books:

1. Forouzan, Data Communications and Networking, II-Edition, (TMH).

References:

1. Tomasi, Advanced Electronic Communication Systems, Sixth edition, 2009, PHI Learning.
2. Tomasi, Introduction to Data Communication Systems, Fourth edition, 2005, Pearson Education.
3. William Stallings, Data and Computer Communications, Eighth edition, Pearson Education.
4. Brijendra Singh, Data Communications and Networks, Third edition, 2011, PHI Learning.
5. A. S. Tanenbum, Computer Network, Fifth edition, 2011, Pearson Education.
6. C. Prakash Gupta, Data communication and Computer Networks, Second edition, 2014, PHI Learning
7. Miller, "Data Network and Communication", First edition, 1999, Cengage Delmar Learning

LIST OF EXPERIMENTS:

1. To perform data transmission using RS-232 Interface.
2. To perform Synchronous and Asynchronous transmission.
3. To perform Parallel and Serial transmission.
4. To perform data transmission using Fiber optics.
5. To demonstrate Protocols in data communication.
6. To demonstrate Wireless communication.
7. To Implementation of Ring topology using DB-9.
8. To perform data transmission using Network Interface Card.
9. To implement cross cable connection and straight cable connection.
10. To demonstrate digital subscriber line-ADSL for broadband connection.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

B.Tech.(Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT 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*				
BTMT511		Automation	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; **Q/A** – Quiz/Assignment/Attendance, MST Mid Sem. Test.

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

Course Objective (CEOs):

Provides the knowledge of the industrial automation, systems design, PLC, DCS installation, modification, maintenance, and repair.

Course Outcomes(COs):

Student will be able to:

1. Demonstrate the General function of Industrial Automation.
2. Implement Programmable Logic Controller in various application.
3. Insure Safety in Industrial Automation.
4. Use various types of Industrial Sensors.

Syllabus

Unit I **10hr**

Introduction to Industrial Automation, type of automation system, Benefits of automation. Automation pyramid, automation tools like PAC, PLC, SCADA, DCS, Comparison of PLC, PAC, and SCADA on the basis of Performance criteria Control system audit.

Unit II **10hr**

Definition of protocol, OSI model, Modbus (ASCI I/RTU), HART Protocol: Introduction, frame structure, programming, implementation examples, benefits, advantages and limitation. Foundation Fieldbus H1: Introduction, frame structure, implementation examples, benefits, advantages and limitation. Comparison of HART, Foundation Fieldbus.

Unit III **8hr**

DCS Project: Development of User Requirement Specifications, Functional Design Specifications for automation tool, GAMP, FDA.

Unit IV **8hr**

Programmable Logic Controllers: Introduction of Advanced PLC programming, Selection of processor, Input/output modules, Interfacing of Input/output devices, study of SCADA software, Interfacing of PLC with SCADA software.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Unit V **10hr**

DCS: Introduction to architecture of different makes, DCS Specifications, configuration of DCS blocks for different applications, Interfacing of protocol based sensors, actuators, Plant wide database management, Security and user access management, MES, ERP Interface.

Text Books:-

1. S.K.Singh, Computer aided process control, PHI, 2004.
2. Webb & Reis, Programmable logic Controllers',(Prentice Hall of India),2002
3. Madhuchhanda Mitra and Samarjit Sen Gupta, "Programmable Logic Controllers(PLC) and Industrial Automation", Penram International Publishing (India) Pvt. Ltd. 2007

References:

1. Gary Dunning, 'Introduction to Programmable logic Controllers', (Delmar Publisher), 2011.
2. Krishna Kant,Computer Based Process control, PHI, 2011.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

B.Tech.(Electronics and Instrumentation)

SUBJECT CODE	Category	SUBJECT 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*				
BTEI511		Instrumentation System Design	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; **Q/A** – Quiz/Assignment/Attendance, **MST** Mid Sem. Test.

***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 introduce the basic functional elements of instrumentation
2. To educate on the comparison between various measurement techniques
3. To introduce various types of control panel and its design.
4. To introduce various transducers and signal conditioning methods.

Course Outcomes (COs):

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

1. Apply knowledge of measurement system.
2. Identify, formulate, and solve the fundamentals of designing
3. Use various types of control panel and its design.

SYLLABUS

UNIT I **12 hr**

Introduction to Chemical instrumental analysis, advantages over classical methods, Laws of photometry(Beer and Lambert's law), Basic Components of analytical instruments,Chromatography: Classification, Gas chromatography: principle, constructional details, Zirconia-probe oxygen analyser.

UNIT II **10 hr**

Colorimeters, spectrophotometers (UV-Visible), monochromators, filters, grating, prism, dual wavelength and double monochromator systems, rapid scanning spectrophotometers, IR spectrophotometers.

UNIT III **10 hr**

Flame Photometry: Principle, constructional details, flue gases, atomizer, burner, optical system, recording system. Atomic absorption spectrophotometers: Theoretical concepts, instrumentation: hollow cathode lamps, burners and flames, plasma excitation sources, optical and electronic system

UNIT IV **6 hr**

Measurement of pH, Conductivity, detection on the basis of scattering-Nephalometer, Laboratory

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Instruments: Centrifuge, oven, waterbath, Incubators, stirrers, Densitometer.

UNIT V **8hr**

Mass Spectrometer (MS): Principle, ionization methods, mass analyzer types – magnetic deflection type, time of flight, quadruple, radio frequency, detectors for MS ,applications X-ray spectrometry: Instrumentation for X-ray spectrometry, X-ray diffractometer.

Text Books:

1. Handbook of Analytical Instruments, R. S. Khandpur, Tata McGraw–Hill Publications, 3rd edition (2010).
2. Instrumental Methods of Analysis, Willard, Merritt, Dean, Settle, CBS Publishers & Distributors, New Delhi, Seventh edition.(2005)

References :

1. Instrumental Methods of Chemical Analysis, Galen W. Ewing, McGraw-Hill Book Company, Fifth edition.(2012)
2. Introduction to Instrumental Analysis, Robert D. Braun, McGraw-Hill Book Company(2008)
3. Patranabis D-Principles of Industrial Inst. TMH Publication(2012)
4. Merritt W H W, Dean LL and Settie JA - Instrumental Methods of Analysis.(2013)
5. Skoog DA and West DM - Principles of Instrumental Analysis. Hand book of Analytical Instrument Technology, Vol-11, Analysis Instruments, Butter worthsScientific Publication, London.(2011)

LIST OF EXPERIMENTS:

1. To perform & Study of Gas chromatograph.
2. To analysis & Study of X-Ray Spectrometer.
3. To understand & Study Ultraviolet & Visible Spectrophotometer.
4. To Analysis & Study of Mass spectrometer.
5. To understand and analysis Viscosity measurement.
6. To perform & study Turbidity measurement.
7. To understand and study conductivity meter.
8. To analysis pH of the given solution using pH meter.
9. Application of Differactometer.
10. Use of Densitometer.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

B.Tech. (Electronics & Instrumentation)

SUBJECT CODE	CAEGORY	SUBJECT 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		Labview	0	0	0	30	20	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; **Q/A** – Quiz/Assignment/Attendance, **MST** Mid Sem. Test.

***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. LabVIEW based Advance Instrumentation, Dr. S. Sumathi,; Prof. P. Surekha, Springer; 1st edition (April 19, 2007) .
2. Dr. S. Sumathi, Surekha P, "Virtual Instrumentation using LABView", ACME Learning, India, ISBN: 1234567175093, 01.12.2010, March 2011. , ISBN-13:

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.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore