



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTEI301		MEASUREMENT AND INSTRUMENTATION	60	20	20	30	20	2	1	2	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):

1. To introduce the basic functional elements of instrumentation.
2. To introduce the fundamentals of electrical and electronic instruments.
3. To educate on the comparison between various measurement techniques.
4. To introduce various storage and display devices.
5. To introduce various transducers and the data acquisition system.

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. To apply knowledge of measurement system.
2. To identify, formulate, and solve the fundamentals of electrical and electronic instruments.
3. Demonstrate various types of introduce various modern storage and display devices.
4. Demonstrate various types of transducers and the data acquisition system.

Syllabus

Unit I

8Hrs

Introduction to measurement: Definition, application and types of measurement System, Accuracy, Precision, sensitivity, Resolution. Functional elements of an instrument, Static and dynamic characteristics, Errors in measurement, Statistical evaluation of measurement data, Standards and calibration.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

Unit II

9Hrs

ELECTRICAL AND ELECTRONICS INSTRUMENTS:

Construction and operation of moving coil, moving iron, Theory and Operation of D' Arsonval. Principle and types of analog and digital voltmeters, ammeters, Determination of B-H curve and measurements of iron loss, Instrument transformers, Instruments for measurement of frequency and phase.

Unit III

7Hrs

COMPARISON METHODS OF MEASUREMENTS

D.C & A.C potentiometers, D.C & A.C bridges, transformer ratio bridges, self-balancing bridges. Interference & screening, Multiple earth and earth loops, Electrostatic and electromagnetic interference, Grounding techniques.

Unit IV

6Hrs

MODERN STORAGE AND DISPLAY DEVICES

Compact Disk CD), DVDs, USB Flash Drive, Hard Drive/SSD, Cloud Storage, OLED, Micro-LED display, Nano-cell Technology, Quantum dot LED (QLED).

Unit V

7Hrs

TRANSDUCERS AND DATA ACQUISITION SYSTEMS

Classification of transducers based upon Transduction principle, Introduction to Smart sensors and Micro Sensors, Introduction to Data Acquisition System (DAS) and its Industrial Application .

Text Books:

1. H.S. Kalsi, "Electronic Instrumentation", Tata McGraw Hill, 4th Edition 2019.
2. D.V.S. Moorthy, "Transducers and Instrumentation", Prentice Hall of India Pvt Ltd, 2nd Edition 2011.

References:

1. A.J. Bouwens, "Digital Instrumentation", Tata McGraw Hill, 1997.
2. Martin Reissland, "Electrical Measurements", New Age International (P) Ltd., Delhi, 2001.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

List of Experiments:

1. Study of CRO and perform component testing using CRO.
2. Study of phase & frequency using Lissajous pattern with help of CRO.
3. Study and Perform Strain using strain gauge.
4. To study and perform LVDT (Linear Variable Differential Transformer) characteristics.
5. Study of function generator with its application.
6. To study and observe the balance condition for the Maxwell's bridge.
7. To study and observe the balance condition for the Schering bridge.
8. To study and observe the balance condition for the Hay's Bridge.
9. To study and observe the balance condition for the Wein's bridge.
10. To study and observe the balance condition for the Anderson's Bridge.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME									
			THEORY			PRACTICAL			Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*					
DTMT302		Basic Digital Electronics	60	20	20	30	20	3	0	2	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):

1. To present the Digital fundamentals, Boolean algebra, and its applications in digital systems
2. To present a problem oriented introductory knowledge of combinational digital circuits and its applications.
3. To explain the various semiconductor memories and related technology.
4. To introduce the sequential circuits involved in the making various digital 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. Describe the number systems, conversions, and their applications.
2. Apply minimization techniques such as K maps, Tabular method etc. for the design of digital circuits.
3. Understand combinational and sequential circuits.
4. Differentiate various type of memories and there use in different applications.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

Syllabus

Unit I **10 Hrs**

BINARY NUMBER SYSTEM:

Binary arithmetic: addition, subtraction, multiplication and division, Complements: 1's, 2's, 9's and 10's. Subtraction using complements, Octal number system, Hexadecimal number system, Conversion among binary, octal, decimal, and hexadecimal number systems, Codes: BCD, Gray, Excess-3, the parity bit.

Unit II **9 Hrs**

LOGIC GATES AND BOOLEAN ALGEBRA:

Primary Gates: symbol, operation and truth-table, NAND, NOR, EX-OR, EX-NOR gates: symbol, operation, truth-table, Positive and Negative logic, De Morgan's theorems, Universal Gate, Laws and theorems of Boolean algebra, simplification of Boolean expression, Sum of products (SOP) and product of sums (POS) expression, Karnaugh maps: Four variable K-maps and their simplification techniques, Don't care condition.

Unit-III **8 Hrs**

COMBINATIONAL LOGIC CIRCUITS:

Arithmetic Circuits: Half adder, full adder, parallel binary adder, 1's complement subtractor circuit, 2's complement subtractor/adder circuits, 8421 adder, half and full subtractor, parallel binary subtractor, Binary to gray and gray to binary code converters, Decoder and Encoder, Multiplexer and Demultiplexers.

Unit-IV **7 Hrs**

MEMORY AND PROGRAMMABLE LOGIC:

Memory Classifications, RAM: Static and Dynamic, ROM: ROM, PROM, EPROM. Programmable Logic Array (PLA), Programmable Array Logic (PAL) and Structure. A/D and D/A Converter.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

Unit-V

8 Hrs

FLIP-FLOPS:

S-R latch, S-R flip-flops asynchronous and synchronous, timing diagram, truth table, excitation table, D flip flop timing diagram, truth table, excitation table T flip flop timing diagram, truth table, excitation table, J K flip flop timing diagram, truth table.

Textbooks:

1. Mano M. M. and Ciletti M., "Digital Design", Pearson Education (2008) 4th ed.
2. Leach D. P., Malvino A. P., Saha G., "Digital Principles and Applications", TMH, (2014), 8th ed.

References:

1. Floyd T. L. and Jain R. P., "Digital Fundamentals", Pearson Education (2008) 10th ed.
2. Tocci R. and Widmer N., "Digital Systems: Principles and Applications", Pearson Education (2007) 10th ed.

List of Experiments:

1. To realize the basic logic gates.
2. To realize the NAND gate as a universal building block.
3. To realize the NOR gate as a universal building block.
4. To realize the HALF ADDER circuit
5. To realize the FULL ADDER circuit.
6. To realize the HALF SUBTRACTOR circuit.
7. To realize the AND-OR-INVERT circuit.
8. To realize the parity checker circuit.
9. To realize the exclusive-OR gate.
10. To realize the SR & JK flip-flop.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTMT303		Analog Electronics	60	20	20	30	20	2	1	2	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):

1. To understand the basic operation of BJT.
2. To learn biasing techniques of BJT
3. To Understand small signal analysis of Transistor.
4. To understand basic operation of FET.
5. To learn concept of Feedback.

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. To explain the operation of BJT and FET.
2. To demonstrate and analyze biasing technique of BJT.
3. To demonstrate small signal analysis of Transistor.
4. To explain concept of feedback.

Syllabus

Unit I

8 Hrs

Bipolar-junction transistor: basic operation, current components and equations, CB, CE and CC configuration, input and output characteristics, Early effect, Region of operations: active, cut-off and saturation region. BJT as an amplifier

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

Unit II

9 Hrs

The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector-Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Thermal Runaway, Thermal Stability.

Unit-III

8 Hrs

Small Signal analysis: small signal Amplifier, Amplifier Bandwidth, Hybrid model, analysis of transistor amplifier using h-parameter, Multistage Amplifier: Cascading amplifier, Boot-strapping Technique, Darlington amplifier and Cas-code amplifier.

Unit-IV

6 Hrs

Introduction of JFETs, Transfer Characteristics, Depletion type MOSFET, Enhancement type MOSFET.

Unit-V

6 Hrs

Concept of Feedback: Positive feedback, Negative Feedback, Transfer characteristics, Application of positive and negative feedback, characteristics, and advantages of negative feedback.

Textbooks:

1. J. Millman and Christos C. Halkias, "Integrated Electronic", 1991 Ed., 2008, TMH.
2. R.L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuits", 9 Ed., 2006, PEI/PHI.

References:

1. S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, "Electronic Devices and Circuits", 2nd Edition, 2008, TMH.
2. B. P. Singh, Rekha Singh, "Electronic Devices and Circuits", Pearson, 2nd Edition, 2013.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

List of Experiments:

1. To demonstrate the input /output characteristics of Common base configuration.
2. To demonstrate the input /output characteristics of Common Emitter configuration.
3. To demonstrate the input /output characteristics of Common Collector configuration.
4. To perform AC, DC analysis.
5. To analyze Fixed bias.
6. To demonstrate Transfer characteristics of FET.
7. To study concept of Feedback.
8. To analyze transfer characteristic of negative feedback.
9. To analyze transfer characteristic of positive feedback.
10. To study application of negative feedback.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

ML307 ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY

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*					
ML-307	Compulsory	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;

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

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.

Chairperson
Board of Studies

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Registrar

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Vice Chancellor

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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 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

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

Chairperson
Board of Studies

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Vice Chancellor
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

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.

Chairperson
Board of Studies

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies

Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Vice Chancellor
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTMT307		Electro-Pneumatic System Lab	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):

1. To develop an understanding of Electro-pneumatic systems.
2. To introduce the fundamentals of electro-pneumatic systems.
3. To study the building blocks of electro-pneumatic systems.
4. To be able to differentiate between electromechanical systems and electropneumatic systems.
5. To apply the skills developed in designing electropneumatic systems.

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:

1. To identify electropneumatic systems.
2. To solve the fundamental problems of electropneumatic systems.
3. To practically demonstrate electropneumatic system.

Syllabus

List of Experiments:

1. Study of electropneumatic systems.
2. To study the basic electrical devices used in electro pneumatics.
3. To study the form of interface between the two parts of an electropneumatic control.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Diploma In Mechatronics Engineering (2020-21)

4. To study the operations of control devices like limit switches, sensors, timers, counters and pressure switches.
5. Study of nozzle-flapper control system and its applications in industry.
6. To study and operate pneumatic control valve.
7. To operate various pneumatic actuators of control systems.
8. To control motor pneumatically.
9. Design single actuator electro pneumatic circuits.
10. Design a sequence circuits using two and three cylinders.
11. Describe the constructional details of solenoid valves.
12. To perform the simulation of electropneumatic systems using p-simulator.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore

Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya Indore