

P.K.UNIVERSITY, SHIVPURI (MP)
(FACULTY OF ENGINEERING & TECHNOLOGY)



EVALUATION SCHEME & SYLLABUS

FOR

Diploma in Electronics & Instrumentation Engineering

(II Year- IV Semester)

(ON)

CHOICE BASED CREDIT SYSTEM (CBCS)

[Effective from the Session: 2025-26]

Evaluation Scheme

STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME IN ELECTRONICS & INSTRUMENTATION ENGINEERING

SEMESTER -IV

SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME			Credits	MARKS IN EVALUATION SCHEME						Total Marks
		Periods/Week				INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
DPROCEI401	Process Instrumentation	3	0	0	3	30	-	30	70	-	70	100
DNETWEI402	Network Filters & Transmission Line	3	1	0	4	30	-	30	70	-	70	100
DELECEI403	Electronics Instruments & Measurements	3	0	0	3	30	-	30	70	-	70	100
DPRINEI404	Principles of Digital Electronics	3	1	0	4	30	-	30	70	-	70	100
DENGIEI405	Energy Conservation	3	0	0	3	30	-	30	70	-	70	100
DPROSEI406	Process Instrumentation Lab	0	0	2	1	-	25	25	-	25	25	50
DNETWEI407	Network Filters & Transmission Line Lab	0	0	2	1	-	25	25	-	25	25	50
DELECEI408	Electronics Instruments & Measurements Lab	0	0	2	1	-	25	25	-	25	25	50
DPRINEI409	Principles of Digital Electronics Lab	0	0	2	1	-	25	25	-	25	25	50
Total		15	2	8	21	150	100	250	350	100	450	700

Department of Electronics Engineering
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P.K. University, Shivpuri (MP)

II Year IV Semester

L	T	P
3	0	0

DPROSEI401: PROCESS INSTRUMENTATION

1. INTRODUCTION:

Introduction of a process and process variable, listing of different process variable and Their definitions, Introduction and definition of the term process instrumentation as applicable to the field of engineering. Importance of process instrumentation for process industry with example of any typical processes

Block diagram of a general instrumentation system, Elements of an instrument. Symbol used in instrumentation system and process flow diagram

2. PRESSURE INSTRUMENTATION:

2.1 Definition.

2.2 Units in SI & CGS system -Bar, Pascal, MPa, N/M², PSI and conversion of one unit into other and conversion of one unit into another.

Pressure Elements- Diaphragm, Force Balance, Bellows, Bourden Tube, Pressure Gauges, Differential Pressure Gauges.

Types of pressure, atmospheric pressure, absolute pressure, gauge pressure, vacuum pressure, Importance of Pressure measurement, Pressure Transmitters/Differential Pressure Transmitters (4-20 mA output).

Advantages of 4-20 mA systems to be explained.

Differential pressure gauge, Uses of manometers for differential pressure measurement.

Measurement of pressure of corrosive fluids-diaphragm seal, liquid seal, Table listing corrosion resistance of Mild Steel, Stainless Steel, Monel and Hastalloyetc, to around four important corrosive fluids used in industry .

Measurement of static and dynamic pressure.

Pressure switch and regulators.

Electrical Methods :

(a) Resistive Methods - Strain Gauge, Potentiometer

(b) Capacitive Methods - Absolute capacitive & differential capacitive method. Calibration of Pressure Gauge/Pressure Transducers/Pressure transmitters/Different Pressure Transmitters with Dead weight pressure gauge tester, Digital pressure indicator (Differential pressure and vaccum)

3 LEVEL INSTRUMENTATION:

3.1 Introduction, head, density and specific gravity their relationship, method of measurement

(a)Slight glass method.

(b)Bob tape method.

- (c) Float method, Material for float, Float and shaft method.
- (d) Magnetic float.
- (e) Displacer method.
- (a) By pressure gauge. (b) Diaphragm box method.
- (c) Air traps method.
- (d) Air pressure balance method or bubbler method.
- (e) Pneumatic force balance method.
- (f) Level measurement in a pressurized vessel using differential gauges and differential Pressure gauges.
- (g) Level measurement of corrosive liquid by use of seal.
- (h) Level measurement by weighing.
- (i) Level of dry material.
- (a) Electrical Conductivity method.
- (b) Capacitance method.
- (c) Radioactive methods.
- (d) Ultrasonic method.
- (e) GWR (Guided Waves Radar)

4 MEASUREMENT OF SPEED:

Speed measurement, Tachometer (Contact type and non-contact type - Details).

5 TEMPERATURE INSTRUMENTATION:

- 5.1 Definition of temperature, temperature scales, conversion of one temperature units into another, importance of temperature instrumentation.
- 5.2 Methods of measurement, industrial liquid thermometer, thermometric liquids and its property, limitation of glass thermometer.
- 5.3 Filled thermometers- Liquids filled, gas filled, vapour filled (construction and working principle of filled thermometers), comparison of various filled system thermometer .
- 5.4 (a) possible sources of errors, ambient temperature effect, compensation of ambient temperature effect along capillary and bourdon.
- (b) Mounting method and location and selection.
- 5.5 Bi-metallic thermometer, principle, construction, material combination of bi-metallic strip its use for control application.
- 5.6 Electrical methods for temperature measurement thermocouple, principle of production of thermal e.m.f, Seebeck effect, Peltier effect, Thompson effect, thermo couple material and temperature range, gauge, protecting tube, standard characteristic curve for thermo couple, measurement of thermo couple e.m.f. by mill (temp Vs. e. m. f.) voltmeter method and potentiometric method, use of compensating leads. Comparison between millimeter method and potentiometric method , calibration of M.C. voltmeter by potentiometer. Mounting of thermo couple.
- 5.7 Possible sources of errors and reference junction compensation.
Resistance Thermometer, principle, bulbs and wells, constructional detail. Properties of resistance elements.
Measurement of resistance by resistance meter, bridge method and potentiometric method.
- 5.8 Semiconductor thermometer, Ranges and limitations.
- 5.9 Radiation pyrometer-Principle of working, working temperature range. Total

radiation pyrometer-construction and working principle.

6 **FLOW MEASUREMENTS:**

- 6.1 Definition of flow-Bernoulli's theorem.
- 6.2 Differential pressure flow meters-Expression for flow rate in terms of differential pressure. Types of restriction, orifice, nozzle, ventury tube, construction and material used. Comparison between orifice, nozzle and ventury tube measurement of differential pressure in flow lines.
- 6.3 Variable area meter (Rotameter) construction, working principle and its advantage over other method.
- 6.4 Positive displacement meter, Rotating lobe meter, Rotating vane meter, or Nutating disc meter reciprocating piston meter.
- 6.5 Velocity Flow Meter:
 - (a) Electromagnetic flow meter.
 - (b) Ultrasonic flow meter.
- 6.6 Mass flow meter solid flow meter by weighting.
- 6.7 Flow through open channel:- Weirs and V-notch.
- 6.8 Methods of measurements of Fluid Flow by means of Orifice Plates nd Nozzles, (for In- compressible fluids).

7 **MOISTURE MEASUREMENT:**

- 7.1 Definition: Direct drying and weighing method.
- 7.2 Electrical Methods: Conductance method, capacitance method.
- 7.3 Use of moisture in process industries.
- 7.4 Humidity measurement definition, absolute humidity, relative humidity, percentage humidity, Dew point, DRY & WET Bulb Hygrometer .

8 **MEASUREMENT OF DENSITY**

Definition relationship between density, pressure at the bottom of column of liquid and weight of a given volume, Relative density / Specific gravity

- 8.1 Liquid level method.
- 8.2 Displacement method.
- 8.3 Hydrometer method.

9 **INSTALLATION :**

Introduction, important symbols, method of installation of instrumentation system, Instrumentation flow diagram (few typical example).

RECOMMENDED BOOKS

- 1 Industrial Instrumentation by Donald P Eckman
- 2 Industrial Instrumentation and Control by S K Singh List of Software/Learning Websites
[https://en.wikipedia.org/wiki/pressure transmitter](https://en.wikipedia.org/wiki/pressure_transmitter)

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DNETCEI402: NETWORK, FILTERS AND TRANSMISSION LINES

DETAILED CONTENTS

1. REVIEW OF NETWORK THEOREMS:

Review of the following, network theorem; superposition, Thevenin's theorem's and maximum power transfer.

2. NETWORKS:

2.1 One Port Network: Series and parallel tuned circuit, Expression for their impedance at any frequency and at Resonance in terms of Q and component values (L, C. & R).

Band width of tuned circuit in terms of resonance frequency and Q.

2.2 Two Port (Four Terminals Networks: Basic concept of the following terms

(a) Symmetrical and asymmetrical networks.

(b) Balanced and unbalance network,

(c) T-network, Ladder network, Lattice network, L Network, Bridge T-network.

(d) Representation of a two port "Block Box" in terms of Z, Y and H parameters and mention of application to transistor as a two port network.

3. SYMMETRICAL AND ASYMMETRICAL NETWORK:

3.1 Symmetrical Network:

(a) Concept and significance of characteristic impedance, propagation Constant, attenuation constant, phase shift constant and insertion loss.

(b) Expression for characteristic impedance, propagation constant, attenuation constant and phase-shift constant in terms of Z_o , Z_{oc} and Z_{sc} for the following

(i) T Network.

(ii) $n(\pi)$ Network.

3.2 Asymmetrical Network:

(a) Concept and significance of iterative impedance image Impedance, image transfer constant and insertion loss.

(b) The half section (L-section) : Splitting of symmetrical T & $n(\pi)$ sections Into half sections, derivation of iterative impedance, image impedance Open and short circuit impedance of half section.

3.3 Star-Delta Transformation: Equivalence of T and $n(\pi)$ network.

4. ATTENUATORS:

4.1 Units of attenuation (decibel and nepers)

4.2 General characteristics of attenuators.

4.3 Analysis and design of simple attenuator of following types

(a) Symmetrical T and π type.

(b) L type.

5. FILTERS:

5.1 Brief idea of the uses of filters networks in different Communication system.

5.2 Connecting of low pass, high pass, band pass and band stop filters.

5.3 Theorem connecting attenuation constant α and characteristics Impedance (Z_0) determination of cut off frequency constant K section.

5.4 Prototype filter section

(a) T and π low pass filter section.

- Reactance frequency characteristics of low pass and its significance.
- Attenuation Vs frequency; phase shift Vs frequency
- Characteristics impedance Vs frequency of T and π .
- Simple design problems of prototype low pass section.

5.5 Active Filter:

Basic Concept of active filter and comparison with passive.

(a) Op. amp. integrator circuit, basic low pass active filter, First and Second order low pass Butter worth filter - Frequency response.

(b) Op. amp. differentiator circuit, basic high pass active filter, First and Second order high pass Butter worth filter- Frequency response.

(c) Basic concept of band pass filters, wide and narrow band pass active filter.

(d) Basic concept of band reject filter, wide and narrow band reject filter.

(e) All pass filter, Frequency response

5.6 Crystal Filter:

(a) Crystal and its equivalent circuit.

(b) Design properties of piezoelectric filters and their use.

5.7 Equalizers:

General Introduction.

6. TRANSMISSION LINE:

6.1 Transmission lines and their application: Shapes of different types of Transmission lines; including 300 ohm antenna feeder cable, 75 ohm co-axial Cable, optical fiber cable, also other different types of cables.

6.2 Distributed (or primary) constants of a transmission line

Equivalent circuit of infinite line;

6.3 Necessity of the concept of an infinite line; Definition of

Characteristic impedance of line; concept of short line

Termination in Z_0 currents no voltages long an infinite Line;

graphical representation; propagation

constant, Attenuation and phase shift constant of the line.

6.4 Relationship of characteristics impedance, propagation

constant, attenuation constant and phase constant in term of

Distributed constants of the line, smith charts.

- 6.5 Conditions for minimum distortion and minimum attenuation of Signal on the line; necessity and different methods of Loading the communication lines.
- 6.6 Concept of reflection and standing waves on a transmission Line; definition of reflection coefficient in terms of Characteristics impedance and load impedance; Definition of Standing wave ratio (SWR), relation between VSWR and Voltage reflection coefficient, maximum impedance on a line in term of characteristics impedance and VWSR.
- 6.7 Transmission line equation; expression for voltage, current And impedance at a point on the lines for lines with and Without losses. Expression for the input impedance of the line. Solving Transmission line problems using Smith Chart.
- 6.8 Input impedance of an open and short circuited line and its Graphical representation.
- 6.9 Transmission line at high frequency, effect of high Frequencies on the losses of a transmission line; Application of transmission line as reactive components And impedance transformer (e.g. Quarter wave and half wave transformer).
- 6.10 Principle of impedance matching using single stub; Comparison of open and short circuit stubs.
- 6.11 Expression for characteristic impedance of open wire and Coaxial lines (No derivation).

RECOMMENDED BOOKS –

- 1) Network Filters and Transmission Lines by AK Chakarvorty; Dhanpat Rai and Co. Publication, New Delhi
- 2) Network Analysis by Soni and Gupta; Dhanpat Rai and Co. Publication, New Delhi
- 3) Network Filters and Transmission Line by Yash Pal; Ishan Publications, Ambala City
- 4) Electrical and Electronics Measuring instrumentation, A.K Sawhney; Dhanpat Rai and Co. Publication, New Delhi
- 5) E-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Websites for Reference: <http://swayam.gov.in>

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DELECEI403: ELECTRONIC INSTRUMENTS AND MEASUREMENT

Basics of Measurements

(10 Periods)

Measurement, method of measurement, types of instruments

Specifications of instruments: Accuracy, precision, sensitivity, resolution, range, errors in measurement, sources of errors, limiting errors, loading effect, importance and applications of standards and calibration

Voltage, Current and Resistance Measurement

(08 Periods)

Principles of measurement of DC voltage, DC current, AC voltage, AC current,

Principles of operation and construction of permanent magnet moving coil (PMMC) instruments and Moving iron type instruments,

Cathode Ray Oscilloscope

(12 Periods)

Construction and working of Cathode Ray Tube (CRT)

Block diagram description of a basic CRO and triggered sweep oscilloscope, front panel controls

Specifications of CRO and their explanation

Measurement of current, voltage, frequency, time period and phase using CRO Digital storage oscilloscope (DSO) : block diagram and working principle Working principle of spectrum analyser.

Impedance Bridge Q Meters

(08 periods)

Wheat stone bridge

AC bridges: Maxwell's induction bridge, Hay's bridge, De-Sauty's bridge, Schering bridge and Anderson bridge

Block diagram description of laboratory type RLC bridge, specifications of RLC bridge.

Block diagram and working principle of Q meter.

Signal Generators and Analytical Instruments (08 Periods)

Explanation of block diagram specifications of low frequency and RF generators, pulse generator, function generator, Distortion factor meter, Instrumentation amplifier: its characteristics, need and working

Digital Instruments

(10 Periods)

Comparison of analog and digital instruments Working principle of ramp, dual slope and integration type digital voltmeter Block diagram and working of a digital multi-meter

Specifications of digital multi-meter and their applications

Limitations of digital multi-meters.

Working principle of logic probe, logic pulser, logic analyzer and signature analyzer.

RECOMMENDED BOOKS Electronics Measurement and Instrumentation by AK Sawhney, Dhanpat Rai and Sons, New Delhi Electronics Instrumentation by Cooper, Prentice Hall of India, New Delhi Electronics Instrumentation by JB Gupta, Satya Prakashan, New Delhi E-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh. Websites for Reference: <http://swayam.gov.in>

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DPRINEI404: PRINCIPLE OF DIGITAL ELECTRONICS

DETAILED CONTENTS

1) INTRODUCTION TO DIGITAL ELECTRONICS:

- i. Basic difference between analog and digital signal.
- ii. Application and advantages of digital signal processing.

2) NUMBER SYSTEM:

- i. Binary, Octal and Hexadecimal number system; conversion from decimal octal And hexadecimal to binary and vice-versa.
- ii. Binary addition, subtraction, multiplication and division including binary points.
- iii. 1's and 2's complements method of subtraction.

3) CODES, CODE CONVERSION AND PARITY:

- i. The 8421 and excess-3 codes; mention of other popular BCD codes.
- ii. Addition of 8421, BCD coded numbers its limitations and excess-3 coded numbers.
- iii. Gray code, Gray to binary conversion and vice-versa.
- iv. Basic concept of parity, single and double parity and error detection.

4) LOGIC GATES:

- i. Definition, symbols and truth tables of NOT, AND, OR, NAND, NOR, EXOR Gates.
- ii. Concept of negative and positive logic.

5) LOGIC SIMPLIFICATIONS

- i. Boolean algebra, Karnaugh-mapping (up to 4 variables) and simple application in Developing combinational logic circuits.
- ii. Implementation of logic equations with gates.
- iii. Use of NAND and NOR gates as universal gates.

6) LOGIC FAMILIES AND DIGITAL ICs:

- a. Logic family classification:
 - i. Definition of SSI, MSI, LSI, VLSI.
 - ii. Bipolar Logic, Diode Logic, Transistor Logic Inverter, TTL logic,
 - iii. MOS, CMOS logic, logic ECL
 - iv. Sub-classification of TTL and MOS logic families.
 - v. Characteristics of TTL and MOS Digital gates delay,
 - vi. Speed of noise margin, logic levels, power dissipation, FAN-IN, FAN-OUT, power supply requirements and comparison between TTL and MOS ICs.

- b. Logic Circuits:
 - i. Open collector and totem pole output circuit operation for a standard TTL, NAND gate.
 - ii. MOS circuit operation for a standard gate (NOR).
- c. Tristate Switch: Normally open and normally closed switch.
- d. Familiarization with commercial digital IC gates, their Number identification and Pin configuration.

7) ARITHMETIC OPERATIONS:

- i. Design of Exclusive or, half adder and half subtractor.
- ii. Design of Full adder circuits and its operation.
- iii. Design of Full subtractor circuits and its operation.
- iv. Some examples (circuits) of code converters.

8) ENCODER, DECODERS & DISPLAY DEVICES ASSOCIATED CIRCUITS:

- i. LED, LCD, seven segment display, basic operation of various commonly used types.
- ii. Four Decoder circuits for 7 segment display.
- iii. Basic decimal to BCD encoder circuits.
- iv. Use of decoders/driver ICs with reference to commercial ICs.
- v. Basic Multiplexer and Demultiplexer

9) FLIP FLOPS:

Operation using waveforms and truth tables of following flip flops. RS, T, ST, D, JK, Master/Slave JK Flip Flops mention of commonly used ICs Flip flops.

10) COUNTERS:

- a. Counters classification.
- b. Binary and decade counters.
- c. Divide by N counters.
- d. Programmable asynchronous counters.
- e. Down counters up/down counter operations.
- f. Presettable asynchronous counters.
- g. Difference between asynchronous and synchronous counters.
- h. Ring counters with timing diagram.
- i. Familiarization with commercial TTL/CMOS counters ICs

11) SHIFT REGISTERS:

- a. Introduction and Basic concepts including shift left and shift right.
- b. Serial in serial out. Serial in parallel out. Parallel in serial out. Parallel in parallel out.
- c. Universal shift register.
- d. Familiarization with common TTL/CMOS ICs.
- e. Buffer register, Tristate Buffer Register.

12) MEMORIES:

- a. Classification according to the following heads.
 - i. Volatile and non-volatile memories.
 - ii. Random access memories and sequential access.
 - iii. Semiconductor and non-semiconductor memories.

- iv. Destructive and non-destructive memories.
- b. Semi-conductor
 - ROMs, PROMs, EPROM, SRAM, DRAM,
 - Basic Structure and working of CCD, R/W memory.

13) A/D AND D/CONVERTERS:

- a. Use of A/D and D/A converters.
- b. Binary resistor network R-2R network.
- c. D/A converter using R-2R.
- d. UP, UP/Down counter type A/D converter.
- e. Successive approximation.
- f. Basic concepts of parallel A/D converter.
- g. Two bit A/D converter.

14) ARITHMETIC CIRCUITS:

Ideas About

- a. Basic Arithmetic logic unit's applications.
- b. Block diagram explanation of binary multiplier circuit.

RECOMMENDED BOOKS -

1. Digital Logic Designs by Morris Mano, Prentice Hall of India, New Delhi
2. Digital Electronics by RP Jain, Tata McGraw Hill Education Pvt Ltd, New Delhi
3. Digital Electronics by BR Gupta, Dhanpat Rai & Co., New Delhi
4. Digital Systems: Principles and Applications by RJ Tocci, Prentice Hall of India, New Delhi
5. E-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.
6. Websites for Reference: <http://swayam.gov.in>

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DENEREI405: ENERGY CONSERVATION

1. Basics of Energy

- 2. Classification of energy-** primary and secondary energy, commercial and non-commercial energy, non-renewable and renewable energy with special reference to solar energy, Capacity factor of solar and wind power generators.

3. Global fuel reserve

Energy scenario in India and state of U.P. Sector-wise energy consumption (domestic, industrial, agricultural and other sectors) Impact of energy usage on climate Energy Conservation and EC Act 2001

Introduction to energy management, energy conservation, energy efficiency and its need Salient features of Energy Conservation Act 2001 & The Energy Conservation (Amendment) Act, 2010 and its importance. Prominent organizations at centre and state level responsible for its implementation. Standards and Labeling: Concept of star rating and its importance, Types of product available for star rating

4. Electrical Supply System and

Motors Types of electrical supply

system Single line diagram

Losses in electrical power distribution system

- 5. Understanding Electricity Bill:** Transformers Tariff structure, Components of power (kW, kVA and kVAR) and power factor, improvement of power factor, Concept of sanctioned load, maximum demand, contract demand and monthly minimum charges (MMC)

- 6. Transformers:** Introduction, Losses in transformer, transformer Loading, Tips for energy savings in transformers

7. Electric Motors

Types of motors, Losses in induction motors Features and characteristics of energy efficient motors, Estimation of motor loading, Variation in efficiency and power factor with loading, Tips for energy savings in motors

8. Energy Efficiency in Electrical Utilities

Pumps: Introduction to pump and its applications, Efficient pumping system operation, Energy efficiency in agriculture pumps, Tips for energy saving in pumps

Compressed Air System: Types of air compressor and its applications, Leakage test, Energy saving opportunities in compressors.

Energy Conservation in HVAC and Refrigeration System: Introduction, Concept of Energy Efficiency Ratio (EER), Energy saving opportunities in Heating, Ventilation and Air Conditioning (HVAC) and Refrigeration Systems.

9. Lighting and DG Systems

Lighting Systems: Basic definitions- Lux, lumen and efficacy, Types of different lamps and their features, Energy efficient practices in lighting

- 10. DG Systems:** Introduction, Energy efficiency opportunities in DG systems, Loading estimation
Energy Efficiency in Thermal Utilities

Thermal Basics: Thermal energy, Energy content in fuels, Energy Units and its conversions in terms of Metric Tonne of Oil Equivalent (MTOE)

Energy Conservation in boilers and furnaces : Introduction and types of boilers, Energy performance assessment of boilers, Concept of stoichiometric air and excess air for combustion, Energy conservation in boilers and furnaces, Do's and Don'ts for efficient use of boilers and furnaces

11. Cooling Towers: Basic concept of cooling towers, Tips for energy savings in cooling towers 6.4
Efficient Steam Utilization

12. Energy Conservation Building Code (ECBC)

ECBC and its salient features

Tips for energy savings in buildings: New Buildings, Existing Buildings

13. Waste Heat Recovery and Co-Generation

13.1 Concept, classification and benefits of waste heat recovery
Concept and types of co-generation system

14. General Energy Saving Tips

Energy saving tips in:

14.1 Lighting

14.2 Room Air Conditioner

14.3 Refrigerator

14.4 Water Heater

14.5 Computer

14.6 Fan, Heater, Blower and Washing Machine

14.7 Colour Television

14.8 Water Pump

14.9 Cooking, Transport

15. Energy Audit

10.1 Types and methodology

10.2 Energy audit instruments

10.3 Energy auditing reporting format

RECOMMENDED BOOKS

Guide book on General Aspects of Energy Management and Energy Audit by Bureau of Energy Efficiency, Government of India. Edition 2015

Guide book on Energy Efficiency in Electrical Utilities, by Bureau of Energy Efficiency, Government of India. Edition 2015

Guide book on Energy Efficiency in Thermal Utilities, by Bureau of Energy Efficiency, Government of India. Edition 2015

Handbook on Energy Audit & Environmental Management by Y P Abbi & Shashank Jain published by TERI. Latest Edition

Important Links:

Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India.

www.beeindia.gov.in.

Ministry of New and Renewable Energy (MNRE), Government of India. www.mnre.gov.in.

Uttar Pradesh New and Renewable Energy Agency (UPNEDA), Government of Uttar Pradesh.

www.upneda.org.in.

Central Pollution Control Board (CPCB), Ministry of Environment, Forest and Climate Change, Government of India. www.cpcb.nic.in.

Energy Efficiency Services Limited (EESL). www.eeslindia.org.

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DPROSEI406: PROCESS INSTRUMENTATION LAB

LIST OF PRACTICALS (ANY TEN EXPERIMENTS)

1. To measure pressure by various methods
 - A. Pressure Gauge (Bourdon, Bellow and diaphragm type)
 - B. Digital Pressure Indicator
 - C. Vacuum pressure by any available vacuum gauge and compare.
2. To measure and record pressure of line by graphic recorder and electronic pressure recorder.
3. To measure level of a tank by
 - A. Sight glass tube and flood method.
 - B. Capacitive level detector
 - C. resistive level detector.
4. To calibrate a pressure gauge using load weight tester and standard pressure calibration.
5. To study the construction and operation of level limit switch and make an application circuit using level limit switch.
6. To draw the I/o characteristic of electronic Pressure transmitter.
7. To measure speed of motor by
 - A. Mechanical tachometer
 - B. Optical tachometer
 - C. Inductive reluctance type tachometer
8. To measure temperature of a furnace by various methods.
 - A. thermometer
 - B. Thermocouple
9. To record level/temperature using universal electronic meter.
10. To measure flow in a pipeline using
11. To measure flow of air using anemometer.
12. To measure density of solution using electronic density meter and hydrometer
13. To measure moisture using Electronic moisture meter.
14. To study various instrumentation symbols used and draw all instrumentation flow diagram of a closed loop process control system.

NOTE: Out of 4 study type practical only 2 practicals should be performed and 10 practicals from other remaining 12 practicals should be performed

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DNETWEI407: NETWORK, FILTERS AND TRANSMISSION LINES LAB
List of Experiment

1. Experimental verifications of the Thevenin's and Norton's Theorem with an a.c. source.
2. Experimental verifications maximum power transfer theorem.
3. To measure the characteristics impedance of a symmetrical T/n (π) network.
4. To measure the image impedance of a given asymmetrical T/n (π) networks.
5. To design and measure the attenuation of a symmetrical T/n(π) type attenuator.
6. For a prototype low pass filter :
 - (a) Determine the characteristics impedance experimentally.
 - (b) Plot the attenuation characteristics.
7. For a prototype high pass filter :
 - (a) Determine the characteristics impedance experimentally.
 - (b) To plot the attenuation characteristic.
8. (a) To plot the impedance characteristic of a prototype band pass filter.
(b) To plot the attenuation characteristic of a prototype band pass filter.
9. (a) To plot the impedance characteristic of m-derived low pass filter.
(b) To plot the attenuation characteristic of a m-derived high pass filter.
10. To design Ist order and IInd order active LPF filter using IC 741 and draw the frequency response curve.
11. To design Ist order and IInd order active HPF filter using IC 741 and draw the frequency response curve.
12. Measurement of characteristics of a short transmission line.
13. Measurement of L & C of lossless transmission line.
14. Measurement of Z_0 of lossless transmission line.
15. Measurement of Attenuation of lossless transmission line.
16. Measurement of Velocity of Propagation in lossless transmission line.

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DELECEI408: ELECTRONIC INSTRUMENTS AND MEASUREMENT LAB

LIST OF PRACTICALS

1. Measurement of voltage, resistance, frequency using digital millimeter
2. Measurement of voltage, frequency, time period and phase using CRO
3. Measurement of voltage, frequency, time and phase using DSO
4. Measurement of Q of a coil
5. Measurement of resistance and inductance of coil using RLC Bridge
6. Measurement of impedance using Maxwell Induction Bridge
7. To find the value of unknown resistance using Wheat Stone Bridge
8. Measurement of distortion using Distortion Factor Meter

RECOMMENDED BOOKS

1. Electronics Measurement and Instrumentation by AK Sawhney, Dhanpat Rai and Sons, New Delhi
2. Electronics Instrumentation by Cooper, Prentice Hall of India, New Delhi
Electronics Instrumentation by JB Gupta, Satya Prakashan, New Delhi
3. E-books/e-tools/relevant software to be used as recommended by AICTE/NITTTR, Chandigarh.

Department of Electronics Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)

II Year IV Semester

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DPRINEI409: PRINCIPLE OF DIGITAL ELECTRONICS-LAB

List of Experiments

1. Do at least 20 experiments familiarization with bread-board. Familiarization with TTL and MOS ICs.
2. Identification of Ic-nos, Pin-nos, Ic types.
3. To observe that logic low and logic high do not have same Voltage alue in input and output of logic gate.
4. To observe the propagation delay of TTL logic gate.
5. Observation of the difference between MOS and TTL gates Under the following heads
 - (a) Logic levels.
 - (b) Operating voltages.
 - (c) Propagation delay.

Display Devices And Associated Circuits.

6. Familiarization and use different types of LEDs common Anode and common cathode seven segment display.
7. Use of 7447 BCD to 7-segment decoder.

Logic Gates.

8. Verification of truth table for 2 Input NOT, AND, OR, NAND, NOR, XOR Gates.
Design and Implementation Of Simple Logic Circuits.
9. To construct a 4-bit even/odd parity generator/checker using XOR gates and to verify their truth tables.
10. To construct half adder and half subtractor using XOR and NAND gates verification of their truth tables.
11. To construct a full adder circuit with XOR and NAND gates.
12. (a) Study of 3 bit adder circuit implemented with or and NAND gates.
(b) To construct 4 bit adder and full subtractor using full Adder chip 7480 and NAND gates.
13. (a) To verify the truth table of 4 bit adder IC chip 7483.

- (b) To construct the 4 bit adder/2's complement subtractor using 7483 and NAND gates.

Flip Flops.

14. To verify the truth table for selected positive edge
Triggered and negative edge triggered F/F of J-K and D type.

Counters

To construct and verify truth table for asynchronous binary and decade using J-K flip flops.

15. (a) To construct divide by 60 counter using ripple.
(b) To use counter IC chip 7493 in the divide by eight mode and divide by sixteen mode.
(c) To construct a divide by 100 counter using CMOS.
16. To construct a divide by 60 counters using synchronous counter IC chips.

Registers.

17. To construct a 4 bit buffer register using 4 bit register IC chip.
18. To construct a 4 bit universal shift register using flip flops.
19. To use a 4035 B universal shift register.

Multiplexers And De multiplexers.

20. To decode a 3 line to 8 line encode from 8 line to 3 line and to observe inputs and outputs.
21. Single plus to 16 line decoder and observation output after a 16 to 4 line encoder.
To use ALU chip for selected arithmetic and logic operation

