SYLLABUS
DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING
SEMESTER – IV

ELECTRONIC MEASUREMENTS AND INSTRUMENTATIONS

Sub. Code: DECE 401 **Credits: 02**

Total Marks: 100 **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks **University Examination: 60 Marks**

BLOCK I

Unit 1: Basics of Measurements

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

Unit 2: Voltage, Current and Resistance Measurement

Principles of Measurement of DC Voltage, DC Current, AC Voltage and AC Current; Principles of Operation and Construction of Permanent Magnet Moving Coil (PMMC) Instruments and Moving Iron Type Instruments; Measurement of DC Voltage and Current; Measurement of AC Voltage and Current; Milli-volt Measurement; Block Diagram of Multimeter; Measurement of Voltage, Current and Resistance using Multimeter; Specifications of Multimeter and their Applications; Limitations with Regard to Frequency and Input Impedance

Unit 3: Cathode Ray Oscilloscope

Construction and Working of Cathode Ray Tube (CRT); Time Base Operation and Need for Blanking During Flyback; Synchronization; 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; CRO Probes; Special Features of Dual Beam; Dual Trace; Delay Sweep; Digital Storage Oscilloscope (DSO): Block Diagram and Working Principle.

BLOCK II

Unit 4: Signal Generators and Analytical Instruments

Explanation of Block Diagram; Specifications of Low Frequency and RF Generators; Pulse Generator; Function Generator; Distortion Factor Meter; Wave Analyzer and Spectrum Analyzer.

Unit 5: Impedance Bridges and Q Meters

Wheat stone Bridge; Introduction to AC Bridges; Block Diagram and Working Principle of Q Meter.

Unit 6:.Digital Instruments

Comparison of Analog and Digital Instruments; Working Principle of Ramp, Dual Slope and Integration Type Digital Voltmeter; Block Diagram and Working of a Digital Multimeter; Measurement of Time Interval, Time Period and Frequency using Universal Counter/Frequency Counter; Working Principle of Logic Probe, Logic Pulser, Logic Analyzer, Logic Comparator, Signature Analyzer and Logic Analyzer.

Suggested Readings:

1. Electronics Measurement and Instrumentation, AK Sawhney, Dhanpat Rai and Sons.
2. Electronics Instrumentation, Cooper, Prentice Hall of India.
3. Electronics Test and Instrumentation, Rajiv Sapra, Ishan Publications.
4. Electronics Instrumentation, JB Gupta, Satya Prakashan.

Note:

1. Eight questions are to be set, at least one question from each unit. Students will have to attempt five questions in all.
2. Use of non-programmable scientific calculator is allowed in Examination Hall.

SYLLABUS
DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING
SEMESTER – IV

DIGITAL ELECTRONICS

Sub. Code: DECE 402 **Credits: 02**

Total Marks: 100 **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks **University Examination: 60 Marks**

BLOCK I

Unit 1: Number System

Binary, Octal and Hexadecimal Number System: Conversion from Decimal and Hexadecimal to Binary and Vice-Versa; Binary Addition, Subtraction, Multiplication and Division including Binary Points. 1's and 2's Complement; Method of Addition/Subtraction; Sign Magnitude Method of Representation; Floating Point Representation.

Unit 2: Codes and Parity

Concept of Code; Weighted and Non-Weighted Codes; Examples of 8421, BCD, Excess-3 and Gray Code.
Concept of Parity; Single and Double Parity and Error Detection.
Alpha Numeric Codes: ASCII and EBCDIC.

Unit 3: Logic Gates and Families

Concept of Negative and Positive Logic; Definition, Symbols and Truth Tables of NOT, AND, OR, NAND, NOR, EXOR Gates; NAND and NOR as Universal Gates.
Logic Family Classification: Definition of SSI, MSI, LSI, VLSI, TTL, C MOS Families and their Sub Classification; Characteristics of TTL and C MOS Digital Gates; Delay, Speed, Noise Margin, Logic Levels and Power Dissipation; Fan-in; Power Supply Requirement; Comparison between TTL and C MOS Families.

Unit 4: Logic Simplification

Postulates of Boolean Algebra, De Morgan's Theorems; Various Identities; Formulation of Truth Table and Boolean Equation for Simple Problem; Implementation of Boolean (Logic) Equation with Gates.

BLOCK II

Unit 5: Arithmetic Circuits

Half Adder and Full Adder Circuit; Design and Implementation; Half and Full Subtracter Circuit; Design and Implementation; 4 Bit Adder/ Subtracter; Adder and Subtractor IC (7484).

Unit 6: Decoders, Multiplexers and De Multiplexers

Four Bit Decoder Circuits For 7 Segment Display and Decoder/Driver ICs; Multiplexers and De-Multiplexers; Basic Functions and Block Diagram of MUX and DEMUX; Different Types and ICs.

Unit 7: Latches and Flip Flops

Concept and Types of Latch with their Working and Applications; Operation using Waveforms and Truth Tables of RS, T, D, Master/Slave JK Flip Flops; Difference between a Latch and a Flip Flop; Flip Flop ICs

Unit 8: Counters and Shift Register

Counter: Introduction to Asynchronous and Synchronous Counters, Binary Counters, Divide by N Ripple Counters, Decade Counter, Pre Settable and Programmable Counters, Up/Down Counter, Ring Counter with Timing Diagram, Counter ICs.

Shift Register: Introduction and Basic Concepts including Shift Left and Shift Right, Serial in Parallel Out, Serial in Serial Out, Parallel in Serial Out, Parallel in Parallel Out, Universal Shift Register, Buffer Register and Tristate Buffer Register, IC 7495.

Suggested Readings:

1. Digital Electronics and Applications, Malvino Leach, Tata McGraw Hill.
2. Digital Logic Designs, Morris Mano, Prentice Hall of India.
3. Digital Fundamentals, Thomas Floyds, Universal Book Stall.
4. Digital Electronics, RP Jain, Tata McGraw Hill, New Delhi
5. Digital Electronics, KS Jamwal, Dhanpat Rai and Co.
6. Digital Electronics, Rajiv Sapra, Ishan Publication.
7. Digital Electronics, BR Gupta, Dhanpat Rai & Co.
8. Digital Systems: Principles and Applications, RJ Tocci, Prentice Hall of India.
9. Digital Electronics, Rajaraman V., Prentice Hall of India.
10. Fundamentals of Digital Electronics, Naresh Gupta, Jain Brothers.

Note:

1. Eight questions are to be set. Students will have to attempt five questions in all.
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SYLLABUS
DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING
SEMESTER – IV

NETWORK THEORY

Sub. Code: DECE 403 **Credits: 02**

Total Marks: 100 **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks **University Examination: 60 Marks**

BLOCK I

Unit 1: Basic Circuit Elements and Waveforms

Introduction; Circuit Components; Assumptions for Circuit Analysis; Definitions; Conservation of Energy; Source of Electrical Energy; Standard Input Signals; Sinusoidal Signal; Kirchhoff's Laws.

Unit 2: Mesh and Node Analysis

Introduction; Source Transformation; Mesh and Node Analysis; Network Equations for RLC Network; Magnetic Coupling.

Unit 3: Network Theorems

Introduction; Superposition Theorem; Reciprocity Theorem; Thevenin's Theorem; Norton's Theorem; Maximum Power Transfer Theorem.; Compensation Theorem.

BLOCK II

Unit 4: Two Port Network

Introduction; Characterization of Linear Time - Invariant Two Port Networks; Open Circuit Impedance Parameters; Short Circuit Admittance Parameters; Transmission Parameters.

Unit 5: Attenuators

Introduction; Nepers, Decibels; Lattice, T Type, Pi Type and L Type Attenuator; Insertion Loss.

Unit 6: Conventional Filters

Introduction; Image Impedance; K Filter; Evaluation of Attenuation Constant; Propagation Constant.

Suggested Readings:

1. Networks and Systems, D. Roy Choudhury, New Age International.

2. Network Analysis & Synthesis, Umesh Sinha, Satya Prakashan.
3. Network Analysis & Synthesis, F.F.Kuo; John Wiley & Sons Inc.
4. Introduction to Modern Network Synthesis, Van Valkenburg; John Wiley
5. Network Analysis: Van Valkenburg; Prentice Hall of India
6. Basic Circuit Theory, Dasoer Kuh, McGraw Hill.
7. A Course in Electrical Circuit Analysis, Soni & Gupta, Dhanpat Rai Publication.
8. Circuit Analysis, G.K. Mittal, Khanna Publication.

Note:

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SYLLABUS
DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING
SEMESTER – IV

LINEAR INTEGRATED CIRCUITS

Sub. Code: DECE 404 **Credits: 02**

Total Marks: 100 **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks **University Examination: 60 Marks**

BLOCK I

Unit 1: Introduction
Classification of IC's, Advantages and Applications.

Unit 2: Principles and Operation of Linear/Analog IC Circuits
Voltage Regulators: Introduction to Voltage Regulates, Linear Voltage Regulators, Switching Regulators.
Audio Power Amplifier: Power Amplifier IC 810, Circuit, Block Schematic, Pin Diagram, Salient Features, Specifications, Ratings, Operating Principles and Applications.
IC Power Amplifier: Principles of Power Amplifier, Audio Power Amplifier Circuit using IC 810, Operating Principle.
Electronic Timers: Introduction to Electric Timer, Timer IC, IC Time Delay Relay, Applications of IC 555.

Unit 3: Principles and Operation of Operational Amplifier (OPAMP)
Differencial Amplifiers: D. C. Amplifiers Necessity and Types, Different Amplifiers, Biasing Circuits for LIC, Necessity, Biasing Circuits, DC Level Shifting Techniques
Operational Amplifiers: Introduction to OPAMP, IC OPAMP, Compensation Techniques, Frequency Compensation, OPAMP Circuits.

BLOCK II:

Unit 4: Principle and Operation of Filters
Introduction to Passive and Active Filter Circuits.

Unit 5: Applications of Operational Amplifiers
Basic OPAMP Applications: Amplifiers, Precision Rectifiers, Sources, Converters
Special OPAMP Applications: Instrumentation Amplifier, Analog Multipliers, Analog Dividers, Analog Multiplexing, Voltage Comparators, Phase locked loops (PLL).
Waveform Generators: Integrated and Differentiator, Sinusoidal Oscillators, Multi-vibrators.

Unit 6: Principle and Operation and Analog Computers

Introduction, Design of Analog Computer.

Suggested Readings:

1. Integrated Electronics: Analog and Digital Circuits and System, Jacob Millman and Christos C Halkies, Tata McGraw Hill.
2. Operational Amplifiers and Linear Integrated Circuits, Robrt F Coughlas and Frederick F Driscoll, Prentice Hall.
3. OP-AMPs and Linear Integrated Circuits, Ramakant A Gayakwad, Prentice Hall.

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SYLLABUS
DIPLOMA IN ELECTRONICS AND COMMUNICATION ENGINEERING
SEMESTER – IV

LINEAR CONTROL SYSTEMS

Sub. Code: DECE 405 **Credits: 02**

Total Marks: 100 **Minimum Pass Marks: 40%**

Internal Assessment: 40 Marks **University Examination: 60 Marks**

BLOCK I

Unit 1: Introduction
Basic Components; Open & Closed Loop; Effect of Feedback; Mathematical Models; Differential Equations; Linear, Non-Linear; Time Invariant & Time-Varying Systems; Impulse Response; Transfer Functions of Linear Systems.

Unit 2: Signal Flow Graph
Rules for Drawing Signal Flow Graph; Mason's Gain Formula; Stability Analysis.

Unit 3: Modeling a Control System
Modeling of Electrical & Mechanical Systems; DC Motor, Error Detector, and Tachometer.

BLOCK II

Unit 4: Time Response Analysis
Characteristics of Control Systems; First & Second Order Systems; Transient Response; Steady-State Error.

Unit 5: Stability Analysis;
Stability of Linear System; Routh-Hurwitz Criterion; Root-Locus Method; Principle & Properties; Frequency Response Plot: Bode Plot.

Unit 6: Compensation
Design of Control Systems; Lead-Lag Compensation; Proportional; Proportional-Integral (π); PID Controller.

Suggested Readings:

1. Automatic Control System, Kuo B.C, Prentice Hall of India.
2. Control System Theory, Das Gupta S, Khanna Publications.
3. Control Systems Engineering, Nagrath I J & Gopal M, New Age International.
4. Modern Control Engineering, Ogata K, P Prentice Hall of India.
5. Modern Control System, Dorf R C & Bishop R.H, Addison Wisley.
6. Industrial Control & Instrumentation, Bolton, Orient Longman.
7. Theory & Applications of Automatic Control, Nakra, New Age International.
8. Modern Control System Theory, Gopal, New Age International.
9. Control Systems, Sinha, New Age International.

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