Skill Development Components

Industrial Automation

VOC 111: Analog and Digital Electronics

Learning Objectives:

1. To introduce students with basic concepts of electronics components, semiconductor devices, power supply and digital electronics
2. To introduce students with the scopes of above components/concepts in practical applications.

Learning Outcomes:

1. Students will able to understand the functioning of basic semiconductor devices, digital components.
2. Students will be able to apply the same for designing of simple applications.

Module -1: Basic Electronic Components

Basic Electronic Components - Resistor – Study of Resistor, Types of resistor, construction, and Color Coding of resistor; Capacitor - Study of capacitor, Types of capacitor and their construction; Inductor - Study of inductor & their types

Semiconductor Devices – P-N Junction Diode, Zener Diode, Light Emitting Diode, Photodiode, Transistor (CE,CB, CC modes), Phototransistor, Field Effect Transistor

Module -2: Power Supply Fundamentals

Power supply building blocks, Rectifier, Need of rectifier, Types of Rectifier, Filter and their types, Zener Diode as voltage regulator, Transistorized voltage regulator, Three terminal voltage regulator such as IC 78XX and IC 79 XX, Adjustable voltage regulator using LM-317

Module -3: Number system and Logic gates

Number System – Decimal, Binary, Octal, Hexadecimal and their conversion. Binary addition, subtractions

Logic Gates – Basic logic gates – AND, OR, NOT; Basic Circuit, Symbol, Truth table, universal gates & their truth table

Boolean Algebra – Basic Laws, De Morgan's Theorem, Conversion of Boolean expression to logic diagram, Simplification Techniques

Module – 4: Combinational Logic

Combination of Logic Gates: Converting a Boolean Expression to a Logic Diagram, Converting a Truth Table to a Boolean Expression, Converting a logic diagram to a truth table, AND-OR logic, Minterm, OR-AND logic, Maxterm, EX-OR gate, EX-NOR Gate, NAND and NOR gate, Universal Property of NAND and NOR gate

Module – 5:

Tutorials, assignments, demonstrations and presentation based on Module I to IV

References:

1. Electronic Devices- Thomas l. Floyd; Pearson Education, Ninth Edition, 2012, New Jersey
2. Principles of Electronics- V. K. Mehta, Rohit Mehta; S. Chand Publishers, Twelfth Edition, 2008, New Delhi
3. Semiconductor Electronics – A. K. Sharma; New Age International publishers, 2001 Reprint, New Delhi
4. Electronic Principles- A. P. Malvino, D. J Bates; Mc. Graw Hill (India Pvt. Ltd), Seventh Indian Edition, 2007, New Delhi
5. Digital Fundamental- Thomas L. Floyd; Third Edition, 1987, Universal Book Stall, New Delhi/ Tenth Edition, 2008, Pearson
6. Digital Design: Principles and Practices- John F. Walkerly; Fourth Edition, Second Impression, 2009,Prentice Hall of India, New Delhi
7. Modern Digital Electronics- R. P. Jain; Fourth Edition,2010, Tata Mc. Graw Hill, New Delhi