

EXAM II REVIEW TOPICS**Sensors, Actuators & Motion Control**

Definitions

- Sensors
- Transducer
- Analyzer
- Noise Immunity
- Validity
- Shielding
- Hysteresis
- Response Time
- Calibration
- Resolution
- Repeatability
- Accuracy

Classes & Types of Sensors

- Tactile
- Proximity & Range
- Vision
- Miscellaneous
- Analog
- Digital

Actuators

- Linear Motion
 - Hydraulic
 - Pneumatic
 - Electromagnetic
 - Electro-mechanical
- Rotary Motion
 - Hydraulic
 - Pneumatic
 - Electric
 - Stepper Motors
 - Servo Motors

Motion Control

- Hard Automation
- Mechanical Stops
- Point-To-Point
- Linear Interpolation
- Circular Interpolation
 - Inner Tolerance
 - Outer Tolerance
 - Total Tolerance
- Open Loop Control
- Closed Loop Control

Switching & Relay Logic

Specification

Poles

Throws

Making/Breaking

Latching/Non-Latching

Switch Nomenclature

Coil Nomenclature

Wire Logic

AND

OR

NOT

Fluid Logic & Logic Diagramming

Pneumatics

Benefits of Pneumatic Controls

System Components

ISO Symbolology

Ports

Positions

Fluid Logic

AND

OR

NOT

Valve & Actuator Diagramming

ISO Layers

Logic Gates

AND

OR

NOT

Truth Tables

Karnaugh Maps / Logic Simplification

PLCs & Ladder Logic Programming

PLC System Components (Diagram)

PLC Memory Map

Scan Time (Diagram)

I/O Scan

Program Scan

Ladder Rungs (Networks)

Coils

Counters

Timers

Sequencers

Robotics Introduction

Asimov's Three Laws for Robots (Automation)

Four D's of Robotic (Automation) Applications

Definitions & Terms

Robot (RIA defn.)

Degree of Freedom

Types of Joints

Wrist Degrees of Freedom

End Effectors

Two Types & Examples

Drive Types

Motion Control Types

Work Envelope

Five Industrial Configurations

Axes

Advantages

Disadvantages

Performance Specifications

Maximum Payload

Nominal Payload

Effective Payload

Speed

Maximum Speed

12 inch Pick & Place

Repeatability

Resolution

Accuracy

Positioning & Coordinates

World Frame

Tool Frame

Robot Frame

Robot Programming in ACL

This material is not on the exam(s) for Spring 2020

Programming Methods

Program Documentation

Good Programming Practices

Programming Sequence

Programming Commands

Automation Ethics

Asimov's Three Laws for Automation

Four D's of Automation Applications

Core Concepts in Engineering Ethics

Stake Holders

Justification of Automation

Ethical Responsibilities