FEEE6301 INDUSTRIAL PROCESS CONTROL AND DYNAMICS (3-0-0)

Module-I (10 Hrs))

Analog Signal Conditioning

Introduction, Principles of Analog Signal Conditioning, Signal-Level Changes, Linearization, Conversions, Zero adjustment, Span adjustment, Level changing, AC/DC Power supply, Filtering and Impedance Matching, Passive Circuits, Divider Circuit, Bridge Circuits, RC Filters, Operational Amplifiers, Op Amp Characteristics, Op Amp Specifications, Op Amp Circuits in Instrumentation, Voltage Follower, inverting Amplifier, Non- inverting Amplifier, Differential Amplifier, Active Filters, Protection Voltage-to –Current Converter, Current-to-Voltage Converter, Integrator, Linearization.

Book-1-Ch-2.2,2.3,2.4,2.5,2.6.

Digital Signal Conditioning

Introduction, Review of Digital Fundamentals, Digital Information, Fractional Binary Numbers, Boolean Algebra, Digital Electronics, Programmable Logic Controllers, Busses and Tri-State Buffers, Converters, Comparators, Digital-to-Analog Converters (DCA), Analog-to-Digital Converters (ADCs), Sample and Hold, Multiplexer and De-multiplexer, decoder and encoder, Pulse modulations, Digital recorder.

Book-1-Ch-3.1,3.2,3.3,3.4,3.5.

Module-2 (20 Hrs)

Thermal Sensors

Definition of Temperature, Metal Resistance versus Temperature Device, Thermistors, Thermocouples, Other Thermal Sensors, Design Consideration.

Book-1-Ch-4.1,4.2,4.3,4.4,4.5,4.6,4.7.

Mechanical Sensors

Displacement, Position Sensors, Strain Sensors, Motion Sensors, Pressure Sensors, Flow Sensors.

Book-1-Ch-5.2,5.3,5.4,5.5,5.6

Optical Sensors

Photodetectors, Pyrometry, Leser Principles,Applications.

Book-1-6.2,6.3,6.4,6.5,6.6.

Final Control

Final Control Operation, Signal Conversions, Switching and Control Devices, Actuators, control Elements.

Book-1-Ch-7.2,7.3,7.4,7.5,7.6.

Discrete-State Process Control

Characteristics of the System, Relay Controllers and Ladder diagrams, PLCs.

Book-1-Ch-8.2,8.3,8.4,8.4,8.5.

Module-3 (10 Hrs)

Controller Principles

Process Characteristics, Control System Parameters, Discontinuous and Continuous Controller Modes, Composite Control Modes.

Book-1-Ch-9.2,9.3,9.4,9.5,9.6.

Analog Controllers

Electronic controllers, pneumatic controllers, design consideration.

Book-1-10.2,10.3,10.4,10.5.
Casecade,Feedforward, and Ratio Control

Casecade Control,Feedfrrward Control,Feedforward-feedback cControl Configuration,Ratio Control.

Book-2, Ch-!0.1,I0.2,I0.3,!0.4,I0.5.

Selective and Adaptive Control Systems

Selective Control, Adaptive Control,Adaptive Control Configuration.

Book-2. Ch-11.1,11.2,11.3,11.4.

TEXT BOOK
1.-PROCESS CONTROL INSTRUMENTATION TECHNOLOGY BY-Curtis D.Johnson.PHI Publication.
2-PROCESS CONTROL PRINCIPLES AND APPLICATIONS BY-Surekha Bhanot.Oxford Publication

Reference:-
Process control Systems and Instrumentation By-Terry Bartelt , Cengage Learning Publication