5th Semester	REL5D003	Industrial Process Control and Dynamics	L-T-P 3-0-0	3 Credits

Industrial Process Control and Dynamics

Module-I: **(10 Hours)**

Introduction, control systems, process control block diagram, control system evaluation, analog and digital processing. **Analog Signal Conditioning:** Introduction, principles of analog signal conditioning, passive circuits, operation, amplifiers, op-amp circuits in instrumentation

Module-II: **(10 Hours)**

Digital Signal Conditioning: Introduction, Review of digital fundamentals, converters, Data Acquisition system.

Thermal Sensors: Introduction, Definition of temperature, Metal resistance versus Temperature devices, Thermistors, Thermocouples.

Mechanical Sensors: Introduction, Displacement, Location or Position sensors, Strain sensors, Motion sensors Pressure sensors, Flow sensors

Module-III: **(10 Hours)**

Optical Sensors: Introduction, Photo detectors, Pyrometry, Optical Sources application. **Final Control:** Introduction, Final control operation, signal conversions, Industrial Electronics, Actuators, Control Elements. **Discrete State Process Control:** Introduction, Definition of Discrete State Process control, Characteristics of the system, Relay controllers and ladder diagram, PLCs. Control Loop.

Module IV **(10 Hours)**

Controller Principles: Introduction, Process characteristics, Control system parameters, Discontinuous controller modes, continuous controller modes, composite control modes. **Analog Controllers:** Electronics Controller, Pneumatic controller. **3. Digital Controllers:** Digital electronics methods, Computers in process control, Characteristics of digital data

Books:

[1] Curtis D. Johnson, "Process Control Instrumentation Technology", PHI Publication.

[2] D. R. Coughanowr, Steven LeBlanc, "Process System Analysis and Control", McGraw Hill, 3rd Edition, 2013

[3] Surekha Bhanot, "Process Control: Principle and Application", Oxford Publications