Course Code: EITS - 211
Course Title: Industrial Instruments

Number of Credits: 03 **Total Hours: 42** **Total Marks: 75**

Prerequisites for the course

Basic knowledge of electronics and instrumentation

Objectives of Course

This course is intended to provide the knowledge of instruments used in the industry. To provide the knowledge of Pressure, Flow, Temperature, Level, Humidity, Torque, Viscosity and Vibration measurements.

Course Content

Unit I	**Explain codes, standards and regulations**	**5 Hours**

Safety and regulations, OHS Regulation: Chemical and biological agents, Noise, vibration, radiation and temperature. Tools machinery and equipment safety, Ladders, scaffolds and temporary work platforms, Rigging, cranes and hoists, Mobile equipment, Electrical safety in different industry.

Unit II	**Metrology**	**5 Hours**

Dimensional measurement, Dial gauges, Gauge blocks, Comparators, Flatness measurement, Optical flats, Sine bar, Angle gauges, Planimeter, Translational and rotational displacement using potentiometers, Strain gauges, Differential transformer, Different types of tachometers, Accelerometers

Unit III	**Installs & Maintains Safety and Process Monitoring Systems**	**10 Hours**

ESD control systems, types, Levels of Shutdown: Unit Shutdown, Process Shutdown, Emergency Shutdown, Emergency Depressurize Shutdown. Electric Pneumatic, Hydraulic, Mechanical, Purposes of different types of ESD, Protection: Personnel, Environmental, Equipment. ESD testing procedures, Partial Stroke Test, Time test, Valve integrity, Interlock checks

Unit IV	**Measurements of physical parameters**	**10 Hours**

Pressure measuring instruments and its types, Level sensing devices and types, Flow measurement instruments, Temperature measuring devices and types, pH measurement and viscosity.

Unit V	**Programmable controllers**	**12 Hours**

Evolution of PLC, architecture and block diagram, Basic Ladder logic, logic functions, electrical wiring diagram, scan cycle, Types of PLC, CPU unit architecture, Input/output devices and it's interfacing, Digital-Analog modules, Communication modules, Special function modules, Programming languages for PLC.

Pedagogy

Lectures/Tutorial/Assignments/

Course Outcome

Student is expected to learn the construction and working of various industrial devices used to measure temperature, level, vibration, viscosity and humidity.

References/Readings

1. Fundamentals of Industrial Instrumentation and Process Control William C. Dunn
2. Principles of Industrial Instrumentation Third Edition, Dipak Patranabis
3. Nakra, B. C. and Chaudhry, K. K., Instrumentation Measurement and Analysis, Tata McGraw Hill (2003).
4. Programmable logic controller: Principle and applications NIIT
5. S. K. Singh, "Industrial Instrumentation & Control" 3rd Edition, Tata McGraw Hill, Reprint 2009.