Course Type	Course Code	Name of Course	L	T	P	Credit
DE	NMED535	Industrial Automation	3	0	0	3

Course Objective

- To understand the need and differentiate between different types of automation systems
- To understand various components of state-of-art automation technologies encountered in modern manufacturing industries.
- To introduce the design and practical aspects of automatic control of machines, processes and systems

Pre-requisite:

Students must had studied manufacturing subjects in undergraduate/postgraduate level.

Learning Outcomes

- Comprehend and differentiate between various types of automation systems.
- Analyze and solve an engineering problem using proper automation technology applicable.
- Apply gathered knowledge to synthesize i.e. design and formulate an industrial automation system.
- Evaluate i.e. test, detect and monitor the working of different automation systems used in the industry.

Module	Topics	Lecture Hours	Learning Outcome
1	Introduction of automation technologies, applications in manufacturing, Types of automation systems – hydraulic, pneumatic, electrical, electronic with comparison. Role of energies in automation – fluid power and electrical. Different types of sensors, actuators, and controllers.	06	Student will be able to understand and differentiate between various types of automation systems and get to know about the types of sensors.
2	Pneumatic systems and circuits: Introduction to pneumatic systems and their components, various types of valves and their applications. Pneumatic circuit design approach and examples. Pneumatic circuit sequencing. Limit switches. Limitations of pneumatic systems.	12	After completion of this module, the students will be well versed with the circuit diagram and application of pneumatic systems in industries.
3	Electro-pneumatic systems and circuits: Basics of electro-pneumatic systems. Electro-pneumatic and electro-hydraulic systems and their components, circuit design, relay control, sequence control application with example, terminal allocation. Sensors – types and interfaces. Industrial controls.	12	At the end of this module, the students will be able to control the pneumatic circuit will electrical signals and also differentiate between pneumatic and electro-pneumatic systems
4	Programmable logic controllers (PLCs): Introduction to PLCs, inputs and outputs and their types. Interfacing of I/O devices with a PLC. Programming languages and instruction sets, ladder logics, structured text, functional blocks and applications. Example of sensor, actuator and controller integration for common microcontrollers	12	This module emphasizes on the need and use of PLCs as the state-of-art automation technology to solve various types of industrial automation problems
	Total	**42**	

Text book:

1. Introduction to Industrial Automation, StamatiosManesis and George Nikolakopoulos, CRC press.

2. Mechatronics. W. Bolton, Pearson publishers, 4th Edition.

References:

1. Industrial Automation: Hands-On, Frank Lamb, McGraw Hill publisher.
2. Fluid power with applications. Anthony Esposito, Pearson Education, 4th Edition.