FUNDAMENTAL OF INDUSTRIAL DRIVE & CONTROL

Unit Code: NM-5.5-AU-03304-2024-V1-IASC

Version: 1.0

NSQF Level: 5.5

Training Parameters

Course	FUNDAMENTAL OF INDUSTRIAL DRIVE & CONTROL
Duration	30 Hours
Occupation	MANUFACTURING
Country	India
Minimum Educational Qualification & Experience	**10+ 3-year diploma in relevant field*** **Plus** **3 Year Relevant Industry Experience** **Or** **3rd year of UG(B.E/B.Tech) in relevant field*** INSTRUMENTATION/ EEE /ECE /MECHANICAL /Electrical/ Mechatronics
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Minimum Duration of the Course	30 Hours, 0 Minutes
Maximum Duration of the Course	30 Hours, 0 Minutes

Module Details

Module 1: Basic Drive and Control

Terminal Outcomes:

- Explain the principles and operation of the drive system.

Duration: *2:00*	Duration: *2:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Define operations and applications of the drive system. - Explain flexibility, control, and energy efficiency in various industrial applications, leading to optimized performance. - Understanding the synchronous speed and slip percentage provides crucial insights into the performance of induction motors. - Understand the basic principles behind industrial drives, including concepts such as electromechanical systems, motor control, power electronics, and feedback control. - Explain protection devices which are essential components in electrical systems, safeguarding equipment, and personnel. - Describe and understand the relations between different electrical factors of the electrical drive system.	- Demonstrate the basic principles of industrial drive, including sensors, actuators, controllers, and communication protocols. - Demonstrate the operation, configuration, and maintenance of drive systems, including variable frequency drives (VFDs) and servo drives. - Develop safety protocols and regulations for industrial drive and control systems, ensuring that participants can work safely in an industrial environment.

Classroom Aids
Whiteboard/blackboard marker/chalk, duster, computer, or Laptop attached to LCD projector

Tools, Equipment, and Other Requirements
Laptop, whiteboard marker, projector, control panel, programming software communication ports, communication cable

Module 2: Operation of drives and associated software tools.

Terminal Outcomes:
- To Identify and troubleshoot common issues in industrial drive systems.

Duration: *2:00*	Duration: *4:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Describe the understanding of the basic components used in electric drive. - Explain the various hardware components like the control unit (CU), power module (PM), and operator panels (BOP & IOP). - Explain the safety integration and provide the solutions that reliably address hazardous situations. - Understand the application-specific wizards in the operator panel and in the software.	- Apply to integrate drives and control systems into larger industrial automation systems, including understanding interfaces, networking, and interoperability. - Demonstrate various methods for maintaining, diagnosing, and resolving issues in drives. - Program and configure drive systems using appropriate software tools.

Classroom Aids	
Whiteboard/blackboard marker/chalk, duster, computer, or Laptop attached to LCD projector	
Tools, Equipment, and Other Requirements	
Laptop, whiteboard marker, projector, control panel, programming software communication ports, communication cable	

Module 3: Drive commissioning & Operation with hardware and software

Terminal Outcomes:
- To understand functions and capabilities of drive parameterization provided by drive manufacturers.

Duration: *3:00*	Duration: *7:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- List the approved software and licenses that should be available on plant operator's PC. - The candidate will be able create projects through software as well with operating Panel. - Understand how to upload/download motor data to drive. - Describe the parameterization of a drive which encompasses a range of capabilities essential for controlling and optimizing motor operation in various applications.	- Demonstrate how to operate with the wizard of BOP/IOP. - Demonstarte how to quick commissioning operation with BOP/IOP devices. - Perform setting additional parameters of drives & diagnostics through BOP/IOP. - Able to access and clear various faults diagnostics in the drive. - Demonstrate various identify/motor selections by online and offline modes using STARTER software. - Able to connect the drive to a computer or programming device using appropriate communication cables.
Classroom Aids	
White board/ black board marker/chalk, duster, computer or Laptop attached to LCD projector	
Tools, Equipment and Other Requirements	
Laptop, white board marker, projector, diagnostic software, panels, etc.	

Module 4: Operation of drive with applications-specific

Terminal Outcomes:
- To understand functions and capabilities of drive parameterization provided by drive manufacturers.

Duration: *3:00*	**Duration**: *7:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
- Understand on/off commands in a drive refers to the methods used to start and stop motor operation or through external devices such as push buttons, switches, or sensors. - They were grasping the concept of jog commands and their significance in industrial drive systems. Learners should understand how jog commands enable manual control of motor speed and direction for specific tasks such as setup, testing, and maintenance. - Describe the operations common in applications where a consistent speed is required, such as conveyor belts, pumps, or fans etc. - Explain Running/reversing and skip frequency operations of a drive provide effective means of controlling the motor direction and mitigating resonance-related issues, contributing to improved performance.	- Apply functions and capabilities of drive parameterization provided by drive manufacturers. - Demonstrate hands-on exercises with different manufactured drives and acquire the skills to utilize various industrial operations. - Demonstrate knowledge of jog commands to real-world scenarios and industrial applications.
Classroom Aids	
Whiteboard/blackboard marker/chalk, duster, computer, or Laptop attached to LCD projector	
Tools, Equipment, and Other Requirements	
Laptop, whiteboard marker, projector, diagnostic software, panels, etc.	