# SYLLABUS FOR THE WRITTEN EXAM TOWARDS ROBOTICS & AUTOMATION POSITION PUBLISHED VIDE ADVERTISEMENT NO.2024/01 & 2024/02 DATED 08/02/2024

**Fundamentals of Robotics:** Definition and classification of robots, Applications of robots in various industries, Basics of robot anatomy (links, joints, end-effectors) Robotic Control Systems: Introduction to control systems, PID control (Proportional, Integral, Derivative), Open-loop vs. closed-loop control, Sensors and Actuators in Robotics: Types of sensors (infrared, ultrasonic, temperature, etc.), Role of sensors in robotic systems, Types of actuators (DC motors, stepper motors, servo motors).

**Kinematics and Dynamics:** Forward and inverse kinematics, Workspace and configuration space, Dynamics of robotic systems. Robot Operating System (ROS): Overview of ROS, Key features and benefits, Basic ROS commands and packages. Fundamentals of C++ programming.

**Introduction to Arduino:** Overview of Arduino boards, Basic components and functions, Setting up the Arduino IDE, Programming Basics, Sensors and Actuators with Arduino: Interfacing various sensors (temperature, light, ultrasonic, etc.), Controlling actuators (LEDs, motors, servos).

**Need of Industrial Automation, Role of PLC in automation, Introduction to the field devices attached to PLC, PLC fundamentals :** Block diagram, PLC components, Power supply, CPU, Input Output modules, Types of input and outputs, Source sink concept in PLC, Scan cycle execution, Introduction of PLC software, Addressing concepts.

Programming instructions, Arithmetic & logical, Compare, Add/Sub/Or-block, Leading edge / trailing edge instructions, Move block application, Timer Block programming, Counter Block programming, Advance instructions ,File handling, Comment functions ,Master control /set / reset function.