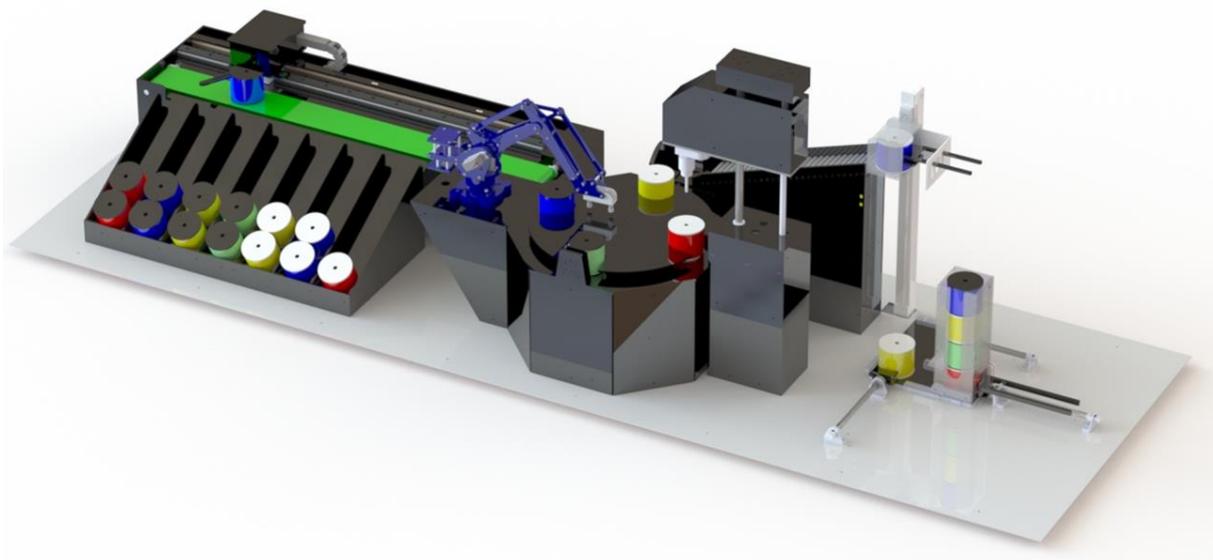


# Miniature Industrial Production System (MIPS)

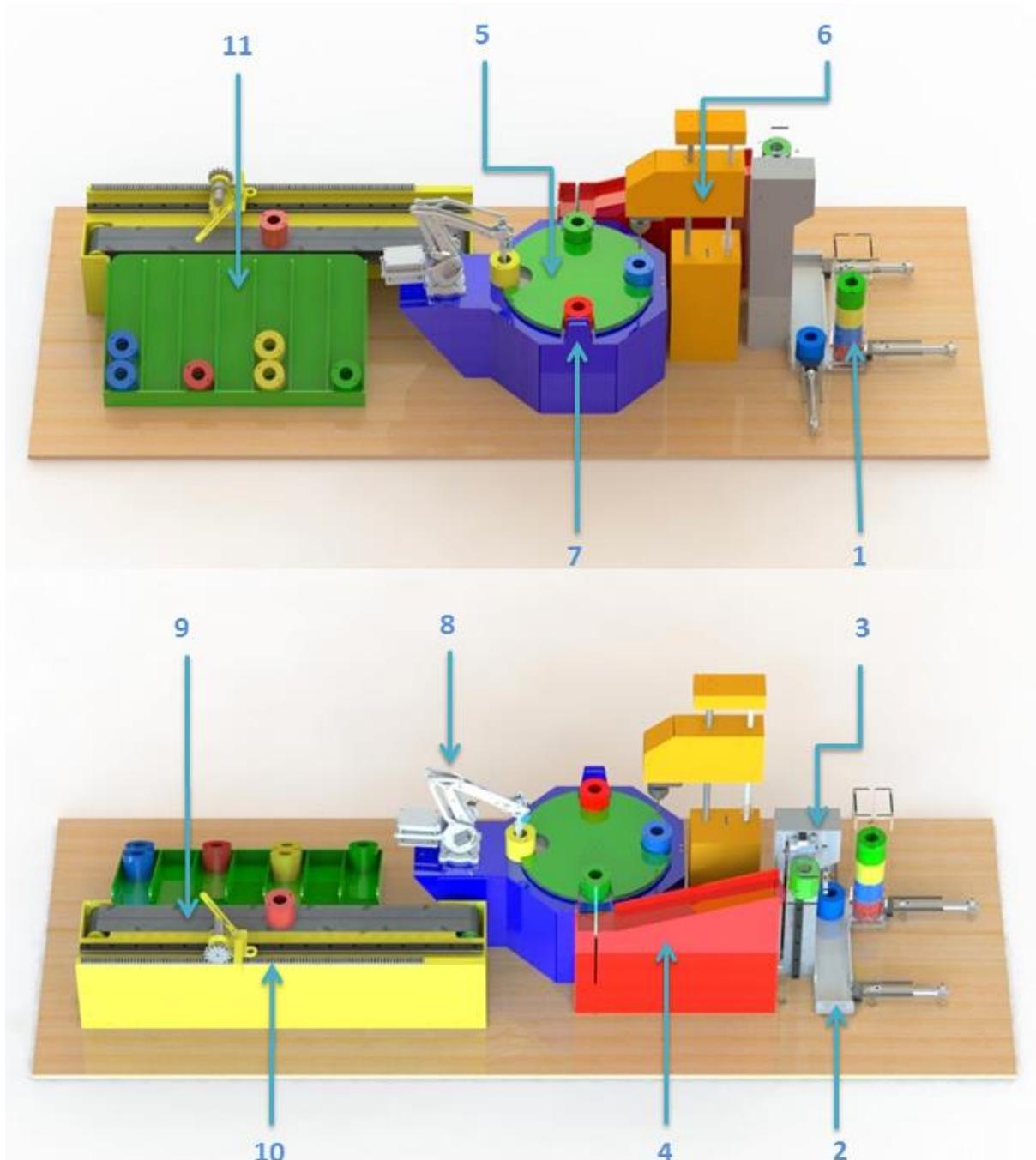
**A PLC based automated production system**



The Miniature Industrial Production System (MIPS) enables the trainees & trainers to acquire thorough knowledge in field of Robotics & Automation starting from basic theoretical concepts to advanced applications. A combination of all the technologies used in the lab, the MIPS is a complete platform to learn about industrial automation. It includes a combination of various sensors, motors, pneumatic components, linear actuators, microcontrollers & PLC, etc. to build a miniature manufacturing unit that performs a specific task.

**Description and scope of work:**

Supply of Miniature Industrial Production System (MIPS) at your institute's campus complete with providing of necessary instruments/equipment and intense training to a maximum of 10 trainees of your choice.



- 1 = Stacking Magazine Module
- 2 = Linear Transfer Module
- 3 = Lifting Module
- 4 = Slide Module
- 5 = Indexing Module
- 6 = Drilling Module

- 7 = Sensing Module
- 8 = Robotic Manipulator Module
- 9 = Conveyor Module
- 10 = Separating Module
- 11 = Storage Module

**Details of various stations in the MIPS:**

- **Dispensing Station:**

The basic function of this station is to load the work pieces in the system & provide them to the next station as per requirements.

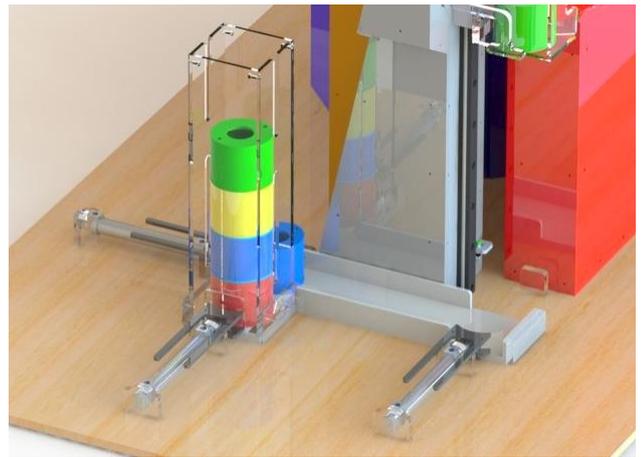
It consists of following modules,

- 1. Stacking Magazine Module:**

- Allows user to load the work pieces in the system & feeds them to linear transfer module by a pneumatic ejector
- Senses the presence of work piece by diffuse scan proximity sensor

- 2. Linear Transfer Module:**

- Uses series of linear pneumatic actuators to loads the work pieces in the material handling station



- **Material Handling Station:**

This station demonstrates material handling technologies with maximum industrial relevance. It handles the work pieces coming from dispensing station & delivers them to the processing station.

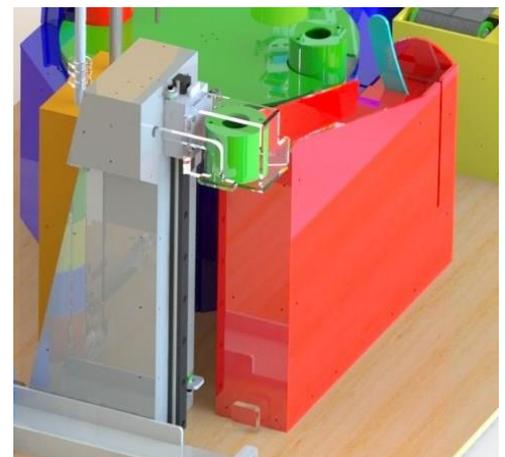
It consists of following modules,

- 1. Lifting Module:**

- Lifts the work pieces from lower level to higher level platform along a vertical guide way
- Uses rotary actuator to push the work piece in slide module

- 2. Slide Module:**

- Work pieces coming from lifting module skates over the slide
- When the work piece reaches the loading actuator zone, loads them in the indexing module for processing



- **Processing Station:**

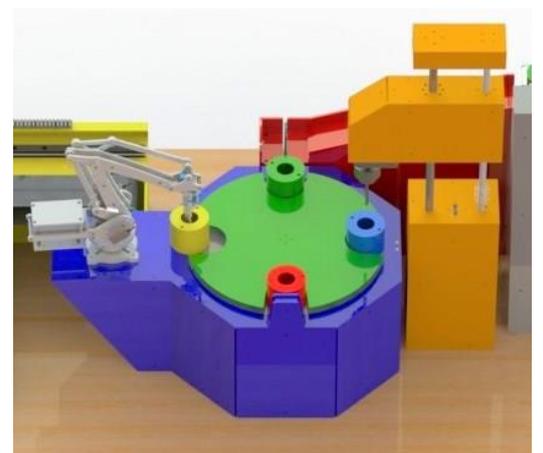
In the processing station the work pieces are tested & processed on rotary indexing table. After performing a series of operations on the work pieces, the finished components are transferred to sorting station. This station only uses electrical drives.

It consists of following modules:

- 1. Indexing Module:**

- A DC geared motor drives the rotary indexing table
- The indexing mechanism gives intermittent rotary motion to the indexing plate on which 4 work pieces can be positioned
- Indexing operation uses an infra-red sensor for feedback
- Does indexing at four spots – Loading spot, Drilling spot, Sensing spot & Robotic manipulator spot
- Uses a diffuse scan proximity sensor to detect the presence of work piece at loading spot of the indexing table

- 2. Drilling Module:**



- Comprises a drilling machine attached to a linear axis driven by a high torque metal geared DC motor
- Uses an Infra-red distance sensor to control the feed (For safety reasons the drilling processes are only simulated)

**3. Sensing Module:**

- Uses an inductive proximity sensor to detect the metallic work pieces
- A colour sensor senses the colour of the work piece & sends the data to the controller

• **Robotic Manipulator Station:**

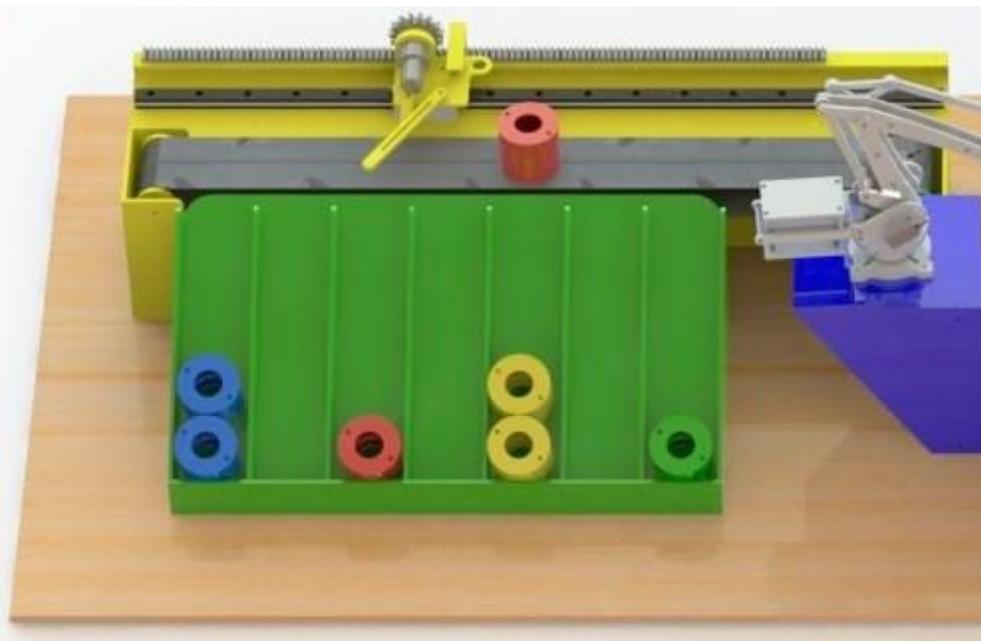
The basic purpose of this station is to demonstrate the integration of industrial robot in a production line.

- Comprises a 4 DOF miniature articulated industrial robotic arm with onboard controller
- Uses high torque metal geared servo motors
- A gripper attached to the robotic arm handles the finished components
- Picks the components from robotic manipulator spot & transfers them to the conveyor system for sorting



• **Sorting & Storage Station:**

At this station, the finished components are sorted based on material in two groups – metallic & plastic. In each group the components are subdivided according to their colour. At the end, the components are stored in separate crates for storing.



It consists of following modules

**1. Conveyor Module:**

- Transports components placed on the conveyor towards the storing module
- Comprises 1-meter rubber conveyor belt, driving & driven drums integrated with bearings & a rotary actuator
- Driven by a high torque metal geared DC motor

**2. Separator Module:**

## *Miniature Industrial Production System (MIPS)*

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- A rail and carriage operated rack and pinion driven pushing device with position feedback places the component in the crate
- Uses a metal geared DC motor to move the carriage & an inductive proximity sensor to determine the exact position of the pushing device
- Positions the carriage according to the commands from controller based on the readings of sensors at sensing module
- The pushing device mounted on carriage stations the component in a specific crate

### **3. Storing Module:**

- Stores components in 7 crates
- Depending upon the material & the colour of the components, stores them in separate crates

Note: The above specifications may change as per the availability of materials.

### **Note:**

- 12 months warranty & technical support
- 12 clock hours of training to a maximum of 10 trainees of your choice at your campus



*Actual image of MIPS*

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