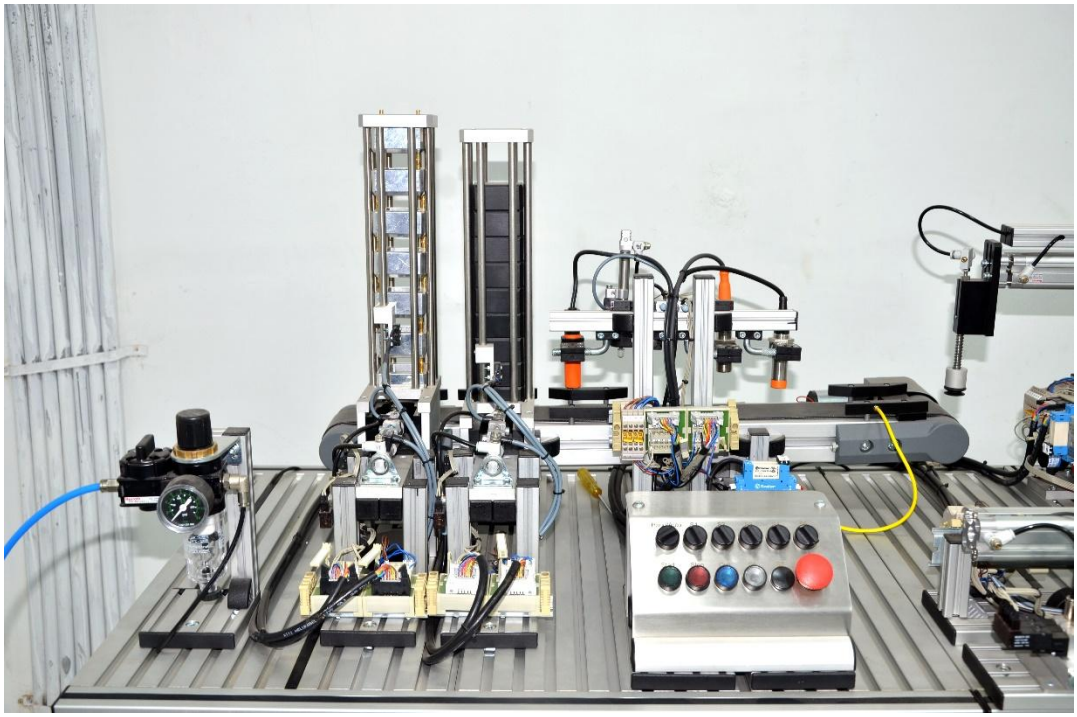
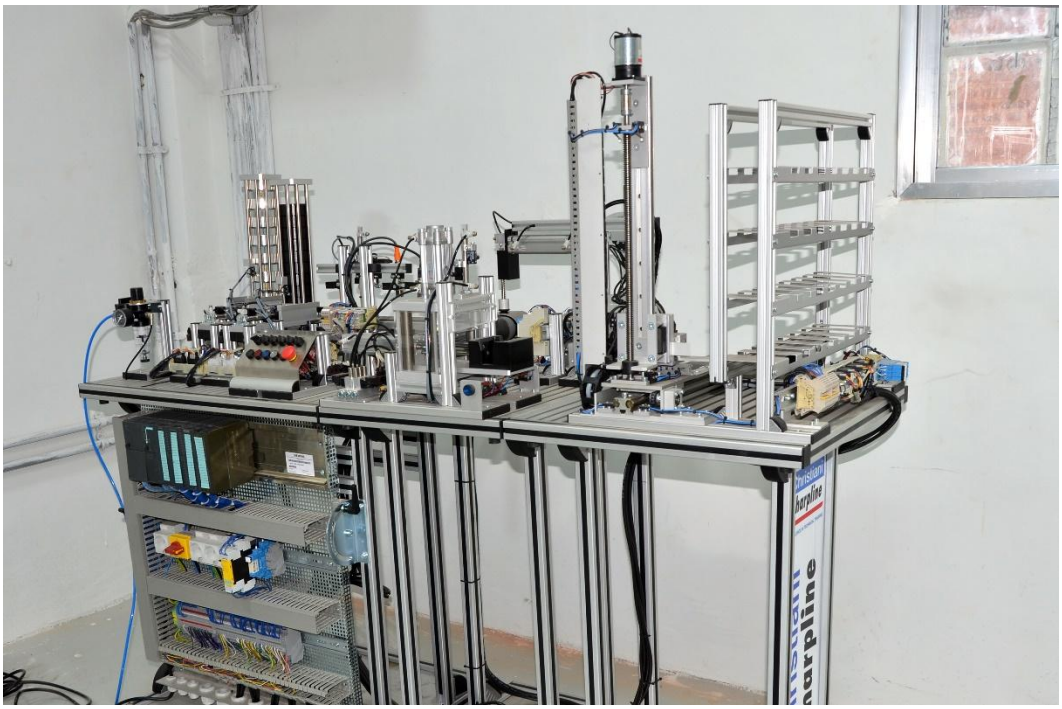
Mechatronics Lab

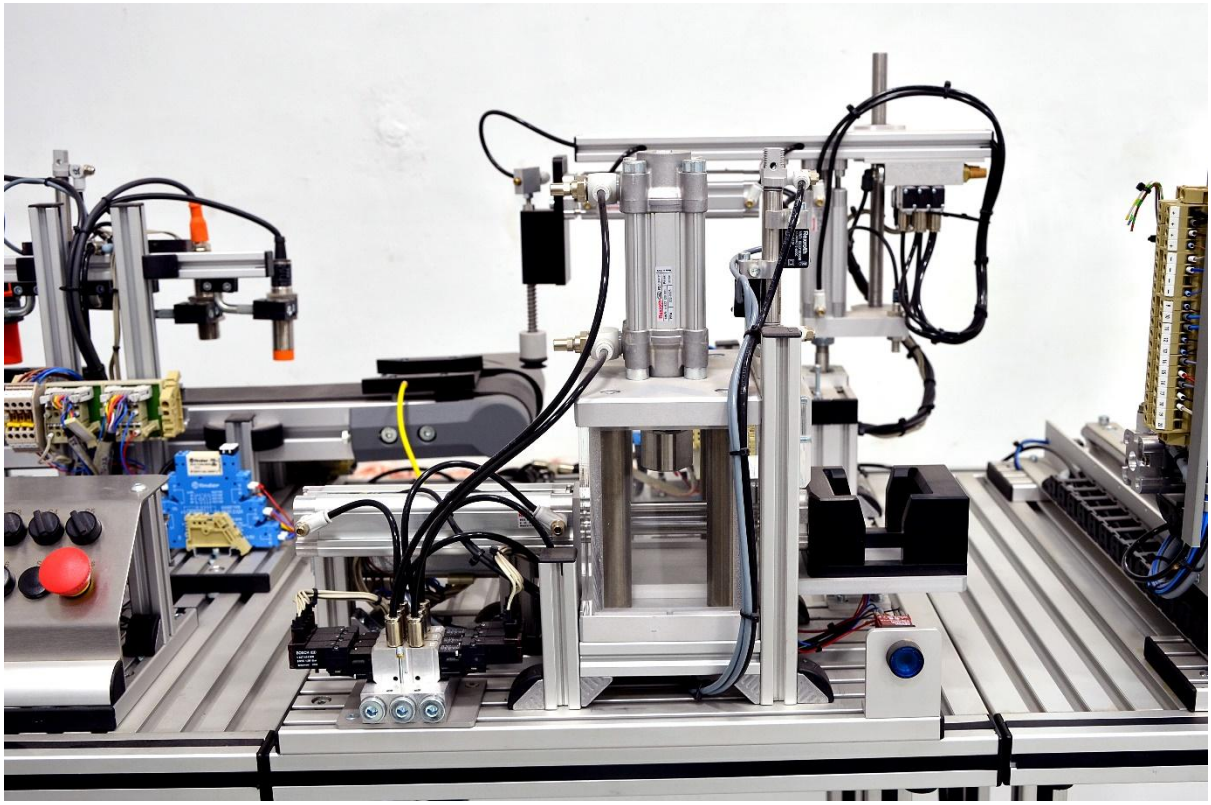
Overview:

The **Mechatronics Lab** is a vital part of the **Siemens Center of Excellence (COE) Patan** focuses on **integrating mechanical systems, electronics, and computer-controlled automation**, providing students with hands-on experience in **robotics, pneumatics, hydraulics, and programmable logic controllers (PLC)**.

This lab equips students with the necessary skills to **design, simulate, and troubleshoot mechatronic systems**, making them industry-ready for sectors such as **automotive, aerospace, industrial automation, and robotics**.







Key Features:

1. **Industrial Automation & Control Systems**
   - Hands-on experience with **Programmable Logic Controllers (PLC) and Human-Machine Interface (HMI)**.
   - Training on **Siemens TIA Portal for automation programming and troubleshooting**.
2. **Robotics & Motion Control**
   - **Industrial robotic arms** for precision handling, welding, and assembly.
   - **Stepper motors and servo systems** for high-precision automation.
3. **Pneumatics & Hydraulics Systems**
   - Study of **electro-pneumatic and electro-hydraulic circuits**.
   - Training with **Siemens automation kits for real-time system integration**.
4. **Sensors & Actuators**
   - Understanding **proximity sensors, limit switches, load cells, and vision sensors**.
   - Implementation of **IoT-based smart sensor networks**.
5. **Industry 4.0 & Smart Manufacturing**
   - **Integration of IoT, AI, and digital twin technology** in mechatronic systems.
   - **Remote monitoring and predictive maintenance** using cloud-based solutions.
6. **Hands-on Training & Industry Certifications**
   - **Siemens-certified courses** on automation, robotics, and mechatronics.
   - Industry-aligned projects in **smart manufacturing, automotive automation, and robotic process automation**.

Expected Outcomes:

1. **Industry-Ready Professionals** – Skilled in **robotics, automation, and motion control systems**.

2. **Enhanced Manufacturing & Production Efficiency** – Implementation of **smart automation techniques**.
3. **Innovation & Research** – Supporting **advanced robotic applications and AI-driven automation**.
4. **Bridging the Skill Gap** – Aligning **academic training with real-world industrial needs**.

The **Mechatronics Lab** plays a crucial role in **developing the next generation of automation and robotics engineers**, ensuring students are well-prepared for the future of **smart industries and intelligent automation**.