

Robotics and Automation Laboratory

This laboratory is intended to provide hands-on experience on industrial robotics, manufacturing automation, mobile robotics, and dynamics and control of field robots. Dual degree students with specialization in Robotics are the primary users of this laboratory. The students experiment with various automation systems and learn to program and implement planning and control algorithms. Also, this laboratory is equipped with various sensors and actuators to perform research experiments as well as to train industrial people.

Laboratory venue details.

Automation Laboratory, ED404B
MoLE: Automation, Instrumentation and
Automobile Center, ED406

Following are the facilities and resources available in the lab.

KUKA Industrial Robot KR5 arc
KUKA youBot : Mobile manipulator robot
Pioneer P3-AT Mobile Robot
B&R Automation Control + Motion Kit
Mentor 35-100 Robot
MTAB-Modular Automation Production
Systems
Simulation Panel: SIMATIC S7- 300 and 1200
Modular Production System – FESTO
Sensors:
Lidar URG-04LX-UG01
Kinect v1 and Kinetic v2
Force sensor

Following are the details of the lab experiments performed by the students.

Industrial robot programming - using KUKA KR5: A brief introduction to a 6-axis serial manipulator, singularities, Cartesian space, and joint space will be given. Following up, students are introduced to basic programming of KR5 manipulator using a handheld device. Students will learn to execute different motion commands and perform different tasks.

Robot Navigation - Implementation of SLAM:

During this lab session, students will be introduced to the integration of Laser rangefinder sensor and



implementation of ROS navigation stack for the KUKA youBot. This package provides local navigation and obstacle avoidance functionalities based on the laser-scanned data.

PLC Programming - Automation of Bottling Plant: Students will be introduced to the basics of logic circuits, Ladder diagrams, introduction to PLC programming, and integration of sensors and actuators through the PLC program. Implementation of PLC on Automation production system - Festo Bottling Plant.



Automation Training with Modular Production System – FESTO: Students will be introduced to various automation processes such as Distribution station, Testing station, Pick and place, Fluidic muscle press, and Storing. The hands-on training is carried out with the PLC programming software CoDeSys 2.3.



