



**AI & ML | ROBOTICS | INDUSTRIAL AUTOMATION
MECHATRONICS | AR & VR**

Robotics Lab Setup



Mentors

Dr. Debanik Roy

Division of Remote Handling & Robotics,
Bhabha Atomic Research Centre (BARC), Mumbai.

Association

VSSC / ISRO | BARC | IIT Delhi

Regional Offices

Orissa | Maharashtra | Gujarat | MP | Delhi
Karnataka | Kerala | Tamil Nadu | WB

Tool Room Facilities

CNC, VMC, EDM & Wire Cut Machines,
Robotics Automation & Integration

6-Month Internship on

Industrial Robotics & Automation

DST Project

Flexible Robotics System | Fumor Robot
Robotics Farm Worker

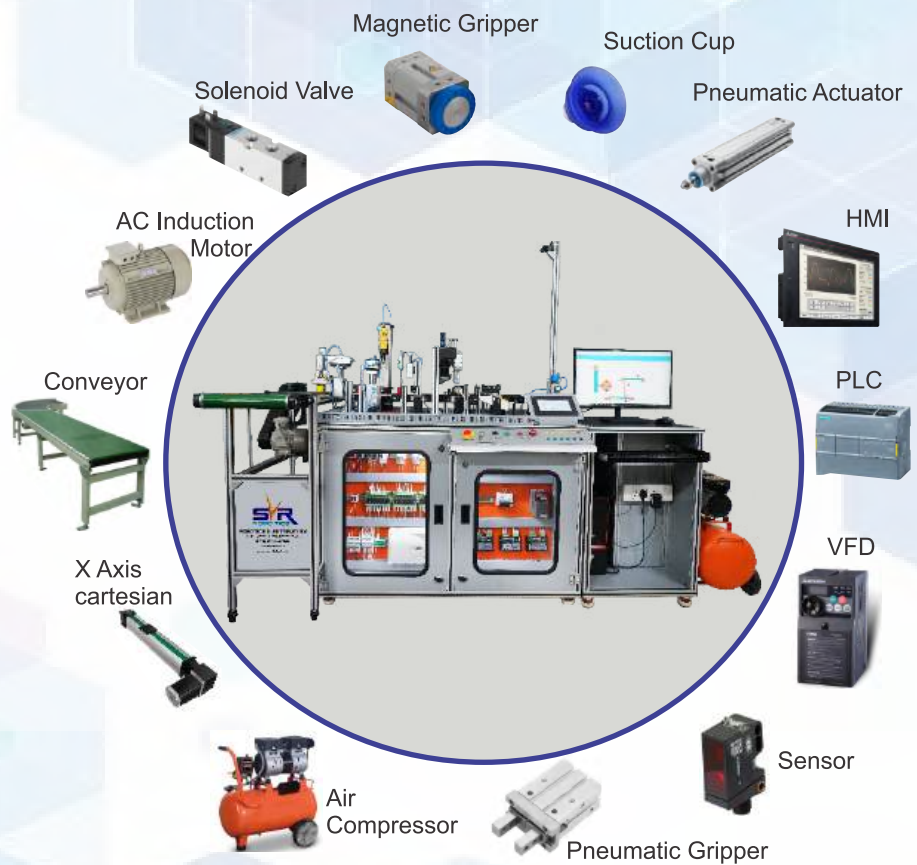
Publication on

More Than 18++ Publications in Springer
International Journals & Conferences



www.svrrobotics.com

Flexible Manufacturing System Industry 4.0



A Flexible Manufacturing System / Modular Manufacturing System offers a complete production process of material feeding, integrated manufacturing like drilling, inspection, sorting based on drilling and depth inspection, cartesian robotic configuration, sorting based on metal / non- metal & colour.

FMS is ideally developed to teach PLC programming, visualization, commissioning and troubleshooting of automated industrial Mechatronics systems to students.

SVR FMS offers a safe environment for students to explore modern Industrial Automation. Students learn to visualize the real-time working of the various gripping by suction cup, pneumatic gripper, magnetic Gripper, etc, integration of Conveyor with PLC, rotary table with various application like drilling & inspection, pneumatic actuator, solenoid valve, PLC, VFD, AC Induction Motor, HMI, Vacuum Ejector, Compressor, Sensor and the other components used.

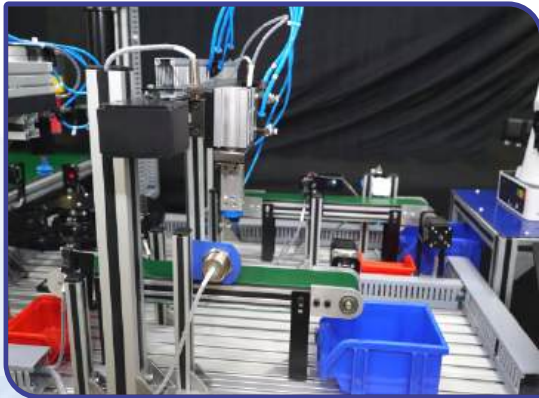
Technical Specification



- AI based Multiple Stations Modular Manufacturing System controlled by a single PLC for
 1. Feeding station (VFD enabled)
 2. Drilling station
 3. Drill inspection station
 4. Sorting based on the Drill inspection result
 5. Metal Non-Metal sorting
 6. Colour sorting
 7. Cartesian configuration
 8. Integration with Robot for various applications.
 9. Virtual Reality application Integrated.
 10. Remote Control Capability: Functionality to enable remote operations, configurable based on customer needs.
 11. Live Feed: Real-time data visualization and monitoring.
 12. Data Recording: Seamless data logging for analysis and insights.
 13. Active Sensor Visualization: Live monitoring and visualization of sensor data.
 14. Process Animation: Simulation of processes similar to a digital twin for enhanced understanding.
- Can be integrated with any Industrial Grade Robot.



Experiment & Benefits for Students



- Working with a 3-phase induction motor using PLC.
- Working with stepper motors using PLC.
- Working with the sensor using a PLC.
- Working with Grippers (Magnetic, Suction, Pneumatic) using PLC.
- Integration and learning of applications for object drilling.
- Study of application on classification of object metal / not metal, colored / non-colored.
- Study the design of HMI for sequencing of Operations, manual / Auto.
- Study of individual hardware interfacing with PLC as well as more than two hardware's looping with each other and

interfacing with PLC.

- Students will work on Industry grade Siemens / Mitsubishi PLC.
- Students learn to develop the programs through the ladder diagram and HMI Programming.
- Students learn the right selection of electronic hardware & wiring harnessing.
- Student Learning -IoT Configuration with PLC: Practical exposure to configuring IoT with Programmable Logic Controllers (PLC).
- Student Learning - IoT Web Application Development: Hands-on training to develop web applications tailored for IoT systems.



SVR Robotics

301/302, Amber Plaza, Nr.Bank of Maharashtra,
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Phone No: +91 9529316252

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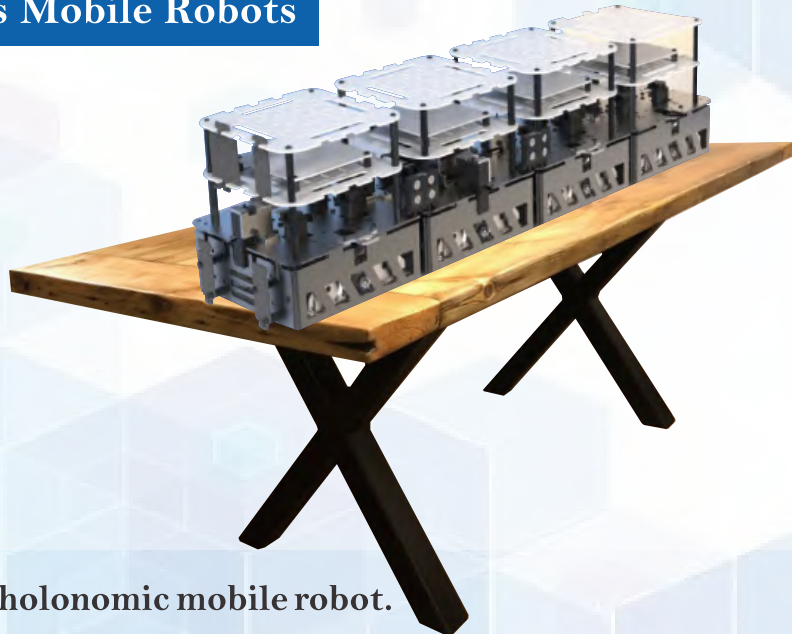
Bipedal Robot



Features:

- ➔ Bipedal Walking: Uses servos for human-like walking motion with precise joint control.
- ➔ Obstacle Avoidance: Ultrasonic sensor detects and avoids obstacles in real-time.
- ➔ Arduino Nano Control: The Arduino Nano manages servo movements and sensor data.
- ➔ Educational Platform: Ideal for learning robotics, control systems, and sensor integration with Arduino.

Smorphi Autonomous Mobile Robots



Features:

- ➔ Self-reconfigurable & holonomic mobile robot.
- ➔ Programmable in various languages like Blockly visuals, C++, Python.
- ➔ Compatible with ROS/ ROS 2
- ➔ Compatible with wide range of sensors.
- ➔ App operated.
- ➔ Extendable and customisable.



Elevator Kit

Features:

- ➔ A scaled-down or simulated elevator model with multiple floors, doors, and a moving cabin. This model mimics real elevator mechanics on a smaller scale.
- ➔ Actual model runs using plc master kit using input and output.



Bottle Filling

Features:

- ➔ Study of a real-time bottle filling plant, with IoT-enabled features to monitor daily production, losses, quality control etc.
- ➔ A fully automated system to learn about bottle weight and bottle sealing.
- ➔ PLC can be programmed for any changes or modifications in the plant.



About Us

SVR Robotics offers customized solutions in Robotics & Automation, including AI & Mechatronics. This includes Multi-Gripper Robot, Pick and Place Robotic arms, different Gripper Systems, Robotic pipe inspection, Mobile Robots, IOT based Electro Pneumatic & Hydraulic Systems, PLC, HMI & SCADA system with static application panel, Sensor lab, FMS, Products for Atal Tinkering / Innovation Labs.

Our expertise in this domain helped us to develop multiple lab across country for educational & commercial customers to reduce time, cost and increase efficiency.

AI based 6 Axis Mitsubishi Robotic Arm

Payload: 3, 8, 13 & 20 Kg

MITSUBISHI ELECTRIC
INDUSTRIAL ROBOT
MELFA RV-8CRL

e-Factory



Mitsubishi Cobot

Payload: 5 Kg

Easy Connecting



AI based SCARA Robot

Payload: 3, 6 & 9 Kg



Fanuc Robot

Payload: 5 to 30 Kg



Grippers



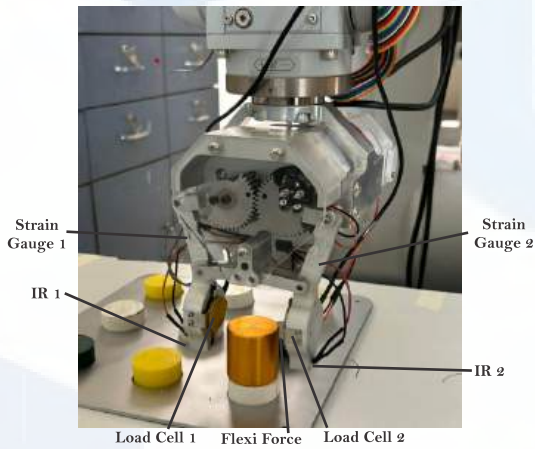
3 - Jaw Concentric Gripper



Electric Gripper



Suction Cup Gripper



Sensorised Gripper



Magnetic Gripper



Gripper Lab

Stewart Platform



RoboMuse 5.0

Robomuse 5.0, with its ROS (Robot Operating System)-enabled features, has a modular mechanical design with a zero turning radius, payloads up to 100 kg and perform object manipulation by installing an arm on top of it or for transportation of heavy items on a factory shop floor, it has been developed by researchers at IIT Delhi

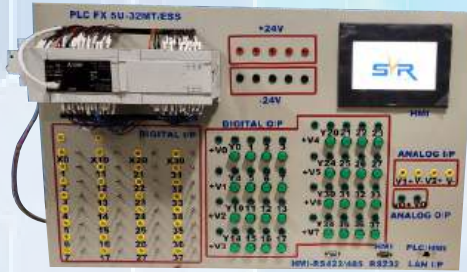


Payload 100 Kg ROS Integrated

PLC HMI SCADA Trainer Kit



Mitsubishi PLC Trainer Kit



Siemens PLC Trainer Kit



Application Kits



VFD Kit



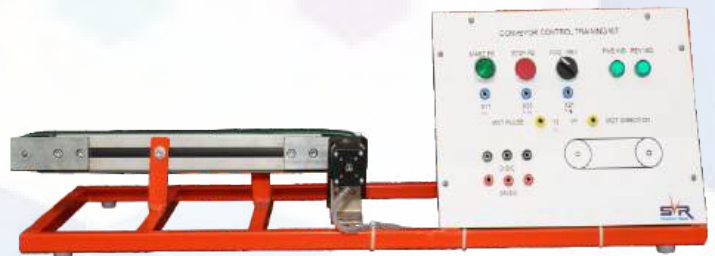
Elevator Simulation Kit



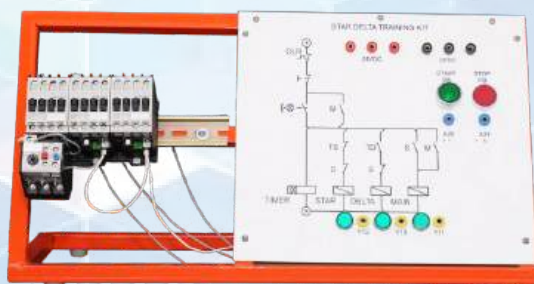
Stepper Motor Speed & Direction Control Kit



Water Level Control kit



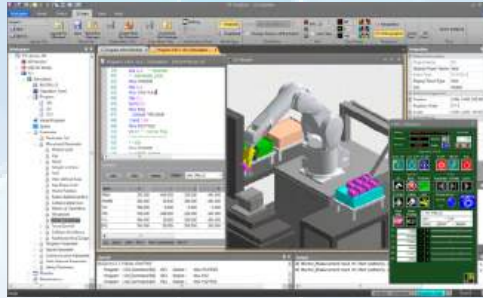
Conveyor Kit



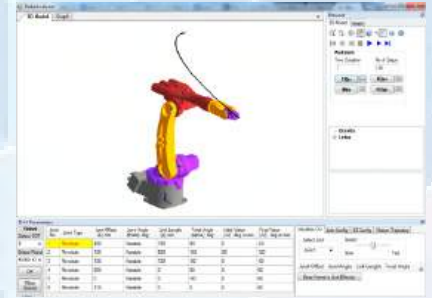
Temperature Control Kit



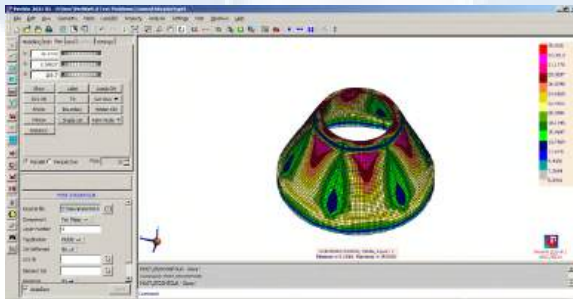
Siemens & Mitsubishi PLC



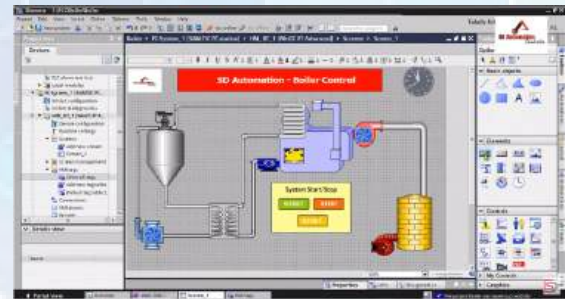
Robotics



RoboAnalyzer & MechAnalyzer



FEAST

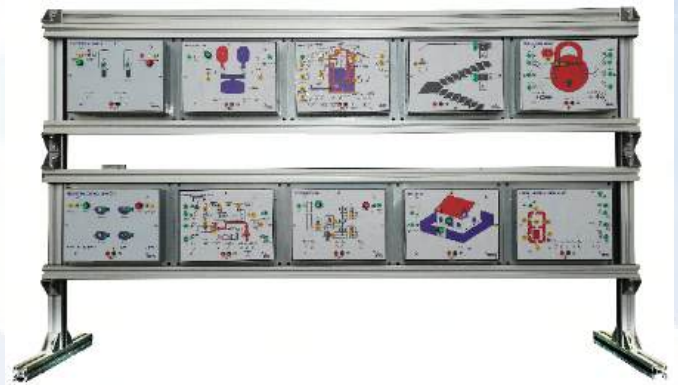


SCADA

Sensor Lab



Static PLC Kit



AR & VR





RoboAnalyzer

A Simulation
And
Research
Software For
Robots

Robotics is a subject that deals with the design, analysis, fabrication and usage of robots for various automated and semi-automated tasks. The concepts taught in a typical robotics course are generally difficult to perceive just by looking at textbook figures. Hence, a need for simulation Software and Hardware for teaching and learning robotics is of prime importance.

RoboAnalyzer® is a 3D model-based software that can be used to teach and learn robotics concepts. It is an evolving product developed in Mechatronics Lab, Department of Mechanical Engineering at IIT Delhi, India.

FEATURES

- ☞ Serial manipulator with prismatic and revolute joints
- ☞ DH parameters as input
- ☞ 3D model generated based on DH parameters
- ☞ Visualize DH parameters
- ☞ Forward Kinematics
- ☞ Inverse Kinematics
- ☞ Inverse Dynamics (Based on ReDySim Algorithm)
- ☞ Forward Dynamics (Based on ReDySimAlgorithm)
- ☞ Animation with trace of end-effector
- ☞ Plot graphs
- ☞ Virtual Robot Module (17+ CAD Models of Industrial Robots)
 1. Level jogging
 2. Cartesian-level jogging
 3. Cartesian straight-line motion
 4. Integration with MATLAB (Robotics Toolbox) and MS Excel
- ☞ Save and Open Robot Models

BENEFITS

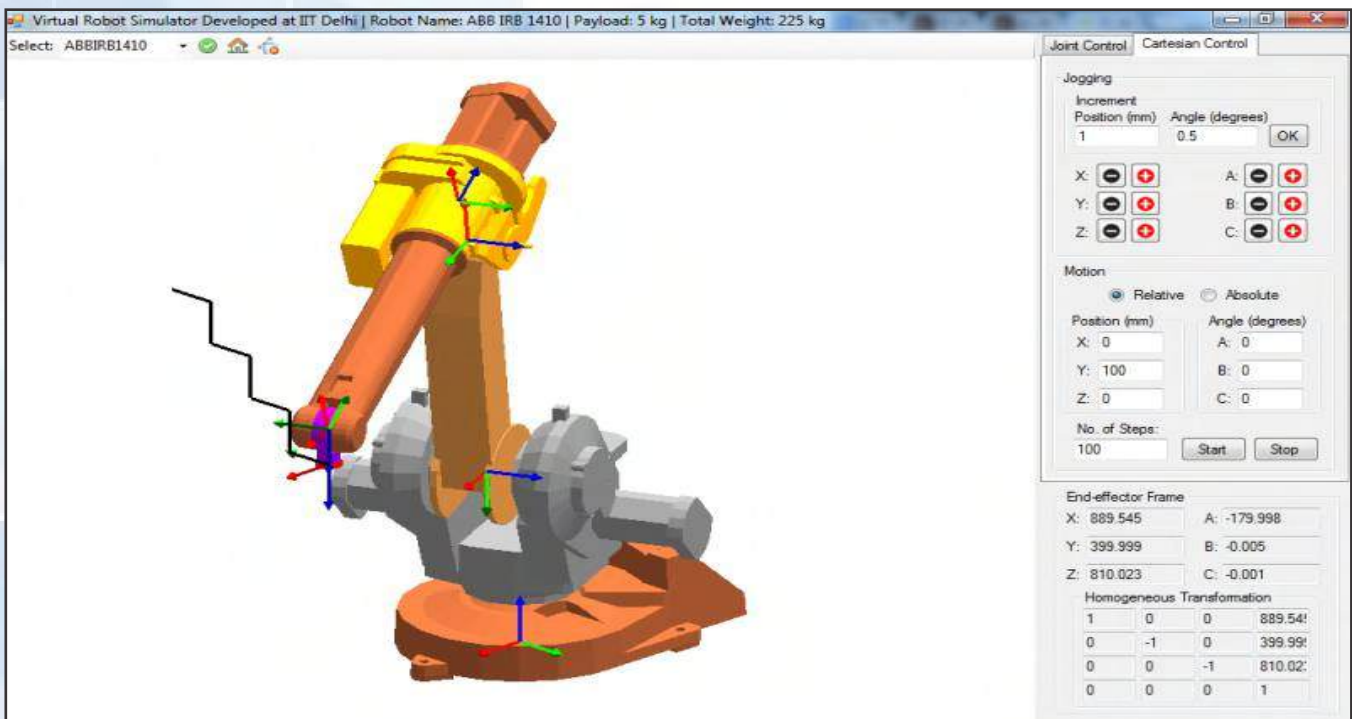
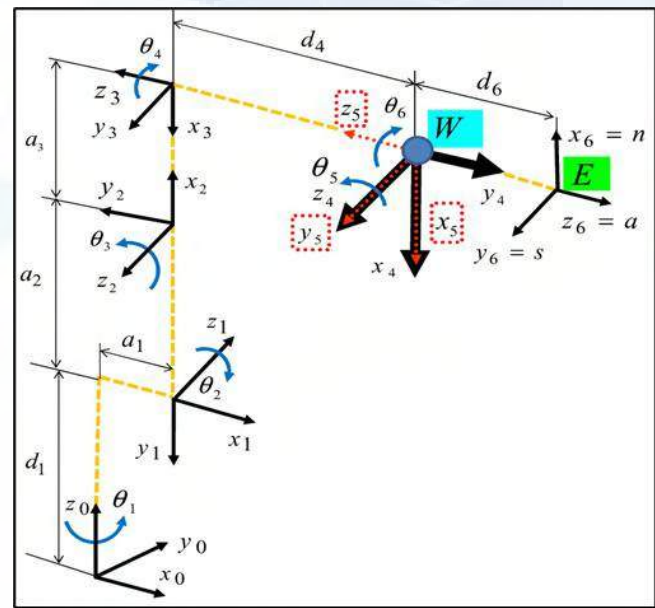
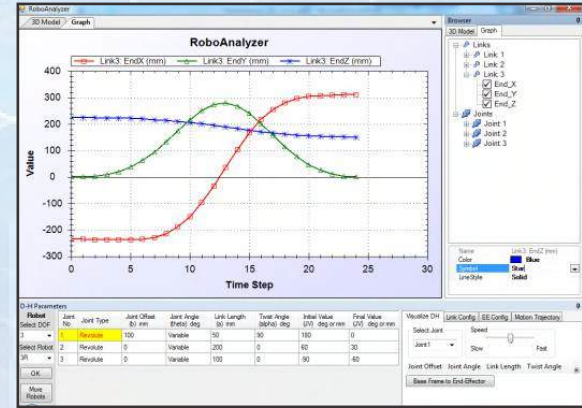


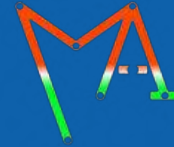
➤ RoboAnalyzer has unique modules for visualization, kinematics, dynamics, and plotting, which can help a Engineers to correlate the physics of a robot to the mathematics involved.

➤ 3D animation environment can help demonstrate the coordinate transformations associated with the four DH parameters, that is, joint offset (b), joint angle (θ), link length (a) and twist angle (α) of two neighboring links coupled by a one-degree-of-freedom (DOF) joint and how they correspond to the physical architecture of the robot.

➤ The perfect understanding of robot behavior can be studied through RoboAnalyzer

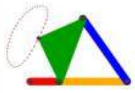
➤ The best software tool to perform the virtual simulation to work on physical Robots available in colleges.



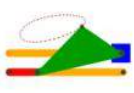


MechAnalyzer

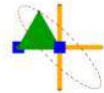
Teaching And Learning Mechanism Software



Four Bar



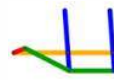
Slider Crank



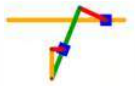
Double Slider



Streeing Mechanism



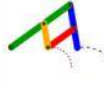
Wiper Mechanism



Whitworth Quick Return



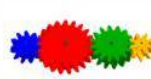
Four bar Quick Return



Pantograph



Cam Mechanism



Gear Mechanism



Jansen Linkage



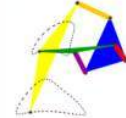
Ghassaei Linkage



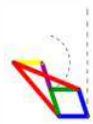
Compound gear train



Geneva Mechanism



Klann Linkage



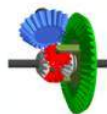
Peaucellier Lipkin Linkage



Hart Inversor



Planetary Gear Set



Differential GeSet



Six Bar 2

MechAnalyzer® is a 3D model based software developed for effective teaching and learning mechanisms related courses. It is an evolving product developed in Mechatronics Lab, Department of Mechanical Engineering at IIT Delhi, New Delhi, India, under the guidance of Prof. S.K. Saha.

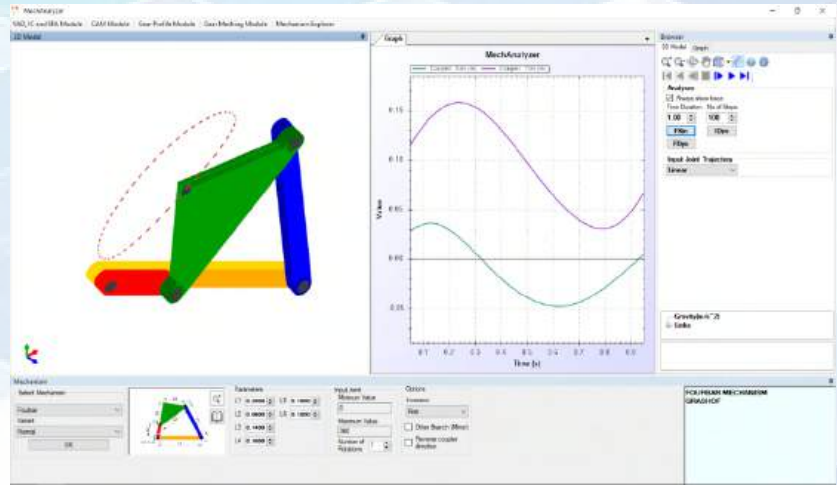
Study of various planar and spatial linkages is covered in Mechanism Design, which is a basic course taught in the curriculum of Mechanical Engineering. Students learn the kinematic and dynamic equations to analyze different types of mechanisms. A computer-based approach to solve these equations becomes imminent when the number of equations increases and also for a quick and better understanding through visualization.

FEATURES

- Around 10 Mechanisms
- Forward kinematics
- Animation with coupler curve
- Plot graphs

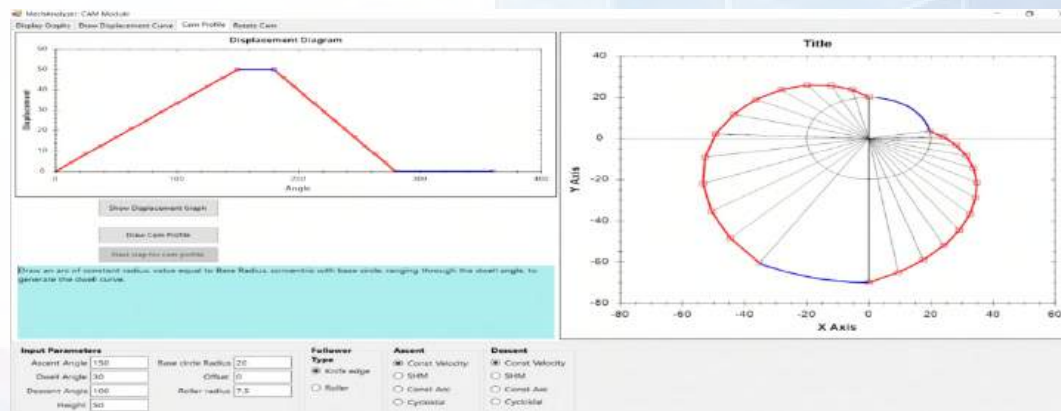
BENEFITS

MechAnalyzer (MA) will help engineering students learn the concepts of mechanisms to build suitable machines and robotic devices. The software has features of animation for understanding the motions of mechanisms like 4/5/6-bar linkages, cams, gears, etc. to engage students in learning concepts including inversions, etc. The graphics are deliberately designed to grab the attention of students and ensure a comprehensive understanding of the subject.



MODULES

- VAD Module
- IC Module
- Gear Profile Module
- Gear Meshing Module



MECHANISM

- Four bar
- Slider Crank
- Double Slider
- Steering Mechanism
- Wiper Mechanism
- Whitworth Quick Return
- Four bar Quick Return
- Pantograph
- Cam Mechanism
- Gear Mechanism
- Compound Gear Train
- Geneva Mechanism
- Jansen Linkage
- Ghassaei Linkage
- Klann linkage
- Six Bar 2
- Peaucellier Lipkin Linkage
- Hart Inversor
- Planetary Gear Set
- Differential Gear Set

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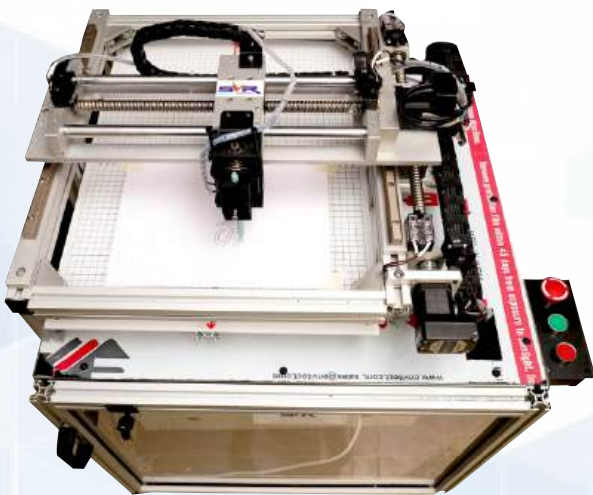
IOT based Electro-Hydraulic Kit



IOT based Electro-Pneumatic Kit



Cartesian Robot





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