



3 days

An intensive professional development training course on

Mechatronics for Engineers and Technicians

Why Choose this Training Course?

Mechatronics is a dynamic and rapidly evolving field that integrates mechanical engineering, electrical engineering, and computer science to create intelligent systems and solutions. This interdisciplinary approach is essential for modern industries such as robotics, automotive, aerospace, and industrial automation. This online training course is designed to provide engineers and technicians with a thorough understanding of the fundamental principles of mechatronics, equipping them with the knowledge and skills to design, implement, and maintain mechatronic systems.

Participants will explore core concepts such as sensors, actuators, control systems, and embedded systems. The online training course emphasizes practical, hands-on training alongside theoretical learning, enabling participants to solve real-world challenges. Whether you are new to mechatronics or looking to enhance your skills, this program offers the tools to succeed in a rapidly changing technological landscape.

SESSIONS

3-5 Sept 2025

Online

VIEW COURSE

By the end of the online training course, participants will not only understand the interdisciplinary nature of mechatronics but also gain the confidence to apply these principles to innovate and optimize industrial processes, create intelligent products, and contribute to advancements in automation and technology.

What are the Goals?

By the end of this online training course, participants will be able to:

- Understand the interdisciplinary integration of mechanical, electrical, and electronic systems in mechatronics
- Explore and apply fundamental principles of sensors, actuators, and control systems
- Learn how to program and use microcontrollers for automation tasks
- Gain hands-on experience in designing, building, and troubleshooting mechatronic systems
- Understand the role of mechatronics in modern industries, including robotics, manufacturing, and automotive

Who is this Training Course for?

This online training course is suitable to a wide range of professionals but will greatly benefit:

- Engineers and technicians in the fields of mechanical, electrical, or electronic engineering
- Professionals in industries such as manufacturing, automation, robotics, and aerospace
- Recent graduates or students seeking to develop skills in mechatronics
- Individuals aiming to enhance their expertise in system integration and industrial automation

How will this Training Course be Presented?

This Luthando Skills online training course will utilise a variety of proven adult learning techniques to ensure maximum understanding, comprehension and retention of the information presented. This includes an interactive mixture of lecture-led learning & group discussions.

Daily Agenda

Day One:

Introduction to Mechatronics

- Overview of mechatronics as an interdisciplinary field
- The evolution and future of mechatronics in industry and technology
- Core components of a mechatronic system: mechanical, electrical, and electronic
- Introduction to mechatronic system design and integration
- Applications of mechatronics in robotics, automotive systems, and industrial automation
- Hands-On: Exploring basic mechanical and electrical components

Day Two:

Control Systems and Automation

- Fundamentals of control systems, including open-loop and closed-loop configurations
- Overview of PID controllers and their role in maintaining system stability
- Introduction to industrial automation and its applications in manufacturing
- Tools and software for designing and simulating control systems
- Hands-On: Implementing and tuning a PID control system

Sensors and Actuators

- Detailed exploration of sensors, including types and functionalities
- Introduction to actuators such as electric motors, hydraulic systems, and pneumatic devices
- Signal processing, interfacing, and calibration techniques
- Integration of sensors and actuators for system functionality
- Hands-On: Building and testing sensor-actuator interfaces

Embedded Systems and Microcontrollers

- Understanding the role of embedded systems in mechatronics
- Basics of microcontroller programming and functionality
- Communication protocols such as UART, I2C, and SPI
- Real-time applications of microcontrollers in mechatronic systems
- Hands-On: Programming a microcontroller to control sensors and actuators

Day Three:

System Integration and Troubleshooting

- Combining mechanical, electrical, and software components into a unified system
- Techniques for diagnosing and troubleshooting mechatronic systems
- Case studies on successful mechatronic system implementations
- Emerging trends in mechatronics, including Industry 4.0 and smart manufacturing
- Final group project: Design, build, and demonstrate a functional mechatronic system
- Hands-On: Collaborative project integrating sensors, actuators, and controllers

Certificate

- Luthando Skills Certificate of Completion for delegates who attend and complete the online training course