PRACTICAL MECHATRONICS FOR ENGINEERS AND TECHNICIANS

YOU WILL LEARN HOW TO:

- Design, build and troubleshoot simple mechatronics systems
- Explain robot mechanics and dynamics without excessive mathematical abstraction
- Implement simple pneumatic, hydraulic valve and actuator-based systems
- Select the appropriate electrical and electro-mechanical drives and actuators for your application
- Design basic analog and digital systems, and simulate them with SPICE software
- Develop machine vision software applications (with RoboRealm)
- Write BASIC-type programs (using PICAXE) for a Microbric robotic vehicle
- Write simple ladder programs for a PLC and simulate them with LogixPro
- Select and interface appropriate sensors for your applications
- Detail basic practical power distribution systems
- Understand the basics of serial (RS-232/485) and Ethernet networking
- Develop software for an industrial robot arm, using RoboLogix

WHO SHOULD ATTEND:

Anyone who wants to gain solid knowledge of the key elements of mechatronics to improve their work skills and to further their job prospects:

- Asset management engineer
- Automation engineers
- Chemical engineers
- Consulting engineers
- Data logging engineer
- Design engineers
- Electrical engineers, technologists, technicians and electricians
- Electronic engineer
- Electro mechanical engineer
- Energy management consultants
- Instrument and process control technicians
- Instrument fitters and instrumentation engineers
- Maintenance engineers and supervisors
- Mechanical engineer
- Plant engineer
- Process engineer
- Process monitoring and plant systems engineer
- Production managers
- Project engineer and managers
- Software engineer
- Systems engineer
- Technologists

Even those who are highly experienced in industrial automation may find it useful to attend some of the topics to gain know-how in a very concentrated but practical format.
Today’s markets are extremely competitive and engineers are continuously engaged in a struggle to produce complex systems with a high level of reliability and performance, yet at a relatively low price. Much of this demand is brought about by the rapidly-evolving microprocessor technology. In order to survive in this highly-competitive environment, developers have to integrate several technologies.

Mechatronics is the answer to this dilemma. It is an interdisciplinary field of engineering and integrates several technologies such as mechanical subsystems, sensors, actuators, instrumentation, subsystems, computers, microcontrollers, PLCs and software. It therefore provides the basis for the integration process, right from the earliest stages of the design process.

Mechatronics is the key to modern video and CD disk drives, camcorders, avionics, aircraft fly-by-wire, computerised fuel injection for motor vehicles, anti-lock braking systems, and smart weapons such as military drones used for aerial reconnaissance purposes. In the process automation field, mechatronics systems are also found in diverse applications such as smart conveyer lines and assembly-line robots.

As with Ethernet networking and wireless (Wi-Fi), the integration of technologies in engineering applications as embodied in mechatronics is upon us, and is here to stay. It is, furthermore, evolving at an exponential rate that will, in a decade from now, probably make some of today’s technologies look like museum artefacts. This makes it almost mandatory for everyone in the engineering world to become familiar with the underlying principles and technologies embodied in mechatronics.

**Practical Labs and Exercises**

Twelve exercises taking 55% of the workshop time
- Analog circuit simulation using Multisim SPICE
- Digital circuit simulation using Micro-Cap SPICE
- Image processing using RoboRealm
- PLC ladder programming and simulation, using LogixPro
- PICAXE software development for Microbric robotic vehicle
- Robot arm program development using Robologix simulator