MIMOSA
TECHNICAL CONSULTING & CONTRACTING

Electronic & Control Systems

Representative electronics, instrumentation and control experiments

14 illustrated examples selected from the wider Leybold / LD DIDACTIC educational range.

VIEW • SELECT • CONFIGURE • INSTALL • TRAIN

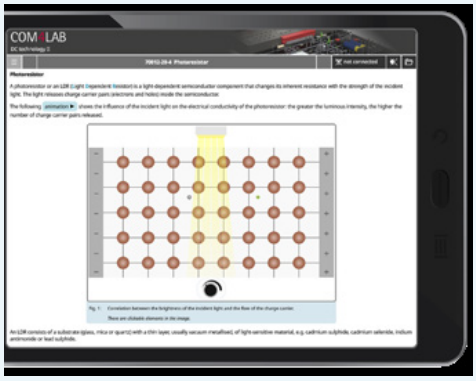
Available experiment examples

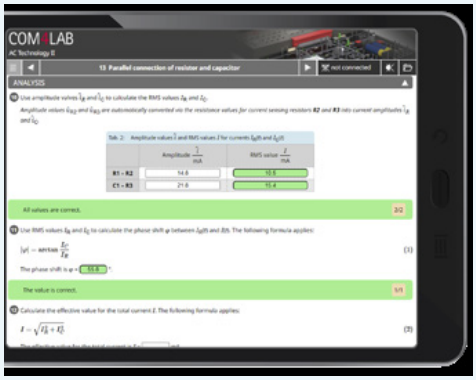
ME1.1.1 / ME1.1.2 | Foundation engineering

DC technology I and II

Interactive COM4LAB courses introduce laws and circuits through guided hardware experiments.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Ohm and Kirchhoff laws; switching; relays; series/parallel circuits; network analysis.





ME1.2.1 / ME1.2.2 | Foundation engineering

AC technology I and II

Measure sinusoidal circuits and component behaviour with integrated instrumentation.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Amplitude and phase; RLC circuits; impedance; resonance; AC power.

Available experiment examples

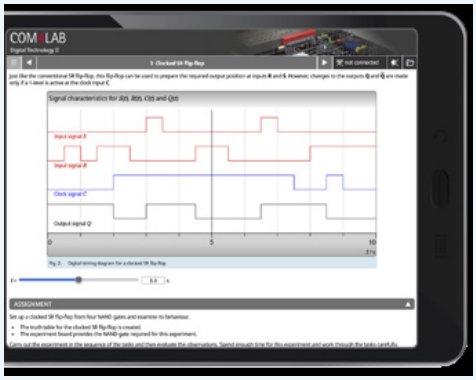
ME1.3.1 / ME1.3.2 | Electronics

Electronic components I and II

Characterise common semiconductor and circuit components.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Diodes; transistors; characteristic curves; rectification; switching and biasing.





ME1.4.1 / ME1.4.2 | Digital electronics

Digital technology I and II

Build and troubleshoot logic circuits with guided course material.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Boolean logic; gates; flip-flops; counters; registers; timing diagrams.

Available experiment examples

ME6.1.1 | Electronics / control

Operational amplifier

Progress from standard op-amp circuits to an implemented function generator.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Inverting and non-inverting stages; summing; integration; differentiation; active functions.





ME6.2.2 | Control engineering

Introduction to control engineering

Develop the principles of feedback through twelve structured chapters.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Controlled systems; P/I/PI/PD/PID control; open and closed loops; digital control.

Available experiment examples

ME6.2.3 | Control engineering

Control loops and stability

Analyse dynamic response and stability of feedback systems.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Loop gain; transient response; stability limits; compensation and disturbance rejection.





ME2 series | Electrical / electronic systems

Electrical machines

Use compact boards to study asynchronous, synchronous and DC machine principles.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Rotating fields; machine characteristics; speed measurement; load and control methods.

Available experiment examples

E6.3.4.3 | Bachelor / advanced automation

Fuzzy control

Design rule-based controllers without requiring a complete mathematical plant model.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Membership functions; fuzzification and defuzzification; fuzzy PI control; temperature, airflow, speed, position and level control with WinFACT.





ME6.2.4 | Bachelor control engineering

Applied modern control engineering

A COM4LAB course covering modern strategies and free experiments with external controlled systems.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Dead-time systems; actuator limits; cascade control; frequency-domain design; fuzzy control; adaptive control.

Available experiment examples

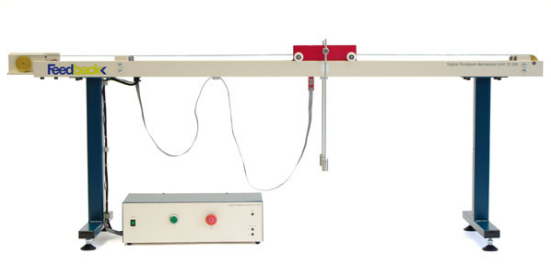
VE6.3.5.2 • 33-005-PCI | Advanced control / projects

Inverted pendulum system

A nonlinear real-time platform for swing-up, stabilisation and crane-control studies using MATLAB-compatible models.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

System identification; nonlinear and linear modelling; real-time PID; swing-up and hold; disturbance and constraint handling.





VE6.3.5.3 • 33-007-PCI | Advanced control / research projects

Twin-rotor MIMO system

A helicopter-like nonlinear plant with two inputs, two outputs and strong cross-coupling.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

MIMO modelling; coupled dynamics; decoupling; parameter identification; 1-DOF and 2-DOF PID control.

Available experiment examples

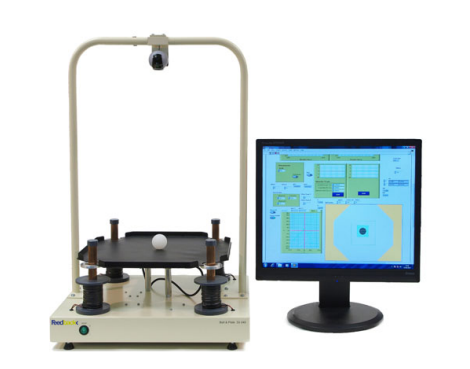
33-052 | Undergraduate / advanced projects

Ball-and-plate control system

An unstable nonlinear platform using camera-based position sensing and real-time LabVIEW control.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Model linearisation; image processing; 1-D and 2-D PID; plate orientation; ball-position and trajectory tracking.





VE6.3.5.4 | Advanced control / projects

Magnetic levitation

An unstable electromagnetic plant for real-time modelling, controller design and disturbance studies.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Plant identification; nonlinear behaviour; feedback stabilisation; controller tuning; set-point tracking and disturbance response.

MIMOSA
TECHNICAL CONSULTING & CONTRACTING

Zein Alabdin Zreik
Maintenance Manager

+963 930 466 602
zein.zreik@mimosasyria.com
www.mimosasyria.com
Abou Romaneh, Shakeeb Arslan Street
Masri Building, Damascus, Syria

mimosasyria mimosa_syria mimosa-syria

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