MIMOSA
TECHNICAL CONSULTING & CONTRACTING

University Physics — Years 1 & 2

Representative undergraduate experiments

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

VIEW • SELECT • CONFIGURE • INSTALL • TRAIN

Available experiment examples

P1.5.1.1 | Year 1

Simple pendulum and gravitational acceleration

Determine gravitational acceleration from pendulum length and oscillation period.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Period measurement; linearisation; uncertainty; comparison with the theoretical pendulum model.





P1.5.2.1 | Year 1

Spring pendulum with CASSY

Record displacement, velocity and acceleration and study mass-dependent oscillation periods.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Hooke's law; harmonic motion; phase relations; curve fitting and digital acquisition.

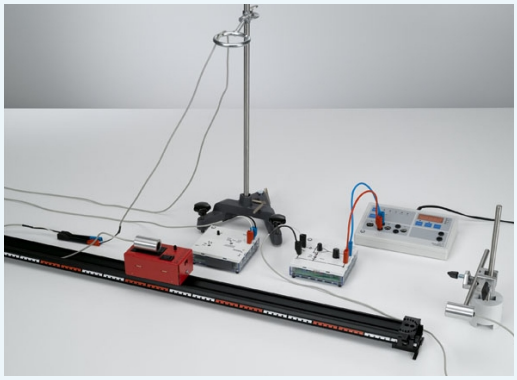
Available experiment examples

P1.7.6.1 | Year 1 / 2

Ultrasonic Doppler effect

Measure frequency shifts for moving sources and observers using 40 kHz ultrasound.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Wave propagation; Doppler equations; velocity and frequency analysis.





P1.8.3.3 | Year 1 / 2

Viscosity versus temperature

Measure dynamic viscosity of Newtonian liquids with a falling-ball viscometer.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Stokes-type behaviour; temperature dependence; calibration and uncertainty.

Available experiment examples

P2.5.2.1 | Year 1

Boyle–Mariotte law

Investigate gas volume as a function of pressure at constant temperature.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Equation of state; pressure sensing; reciprocal plots; experimental limitations.





P3.2.3.4 | Year 1

Wheatstone bridge

Determine unknown resistance using a null-balance bridge.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Kirchhoff laws; bridge balance; precision resistance measurement.

Available experiment examples

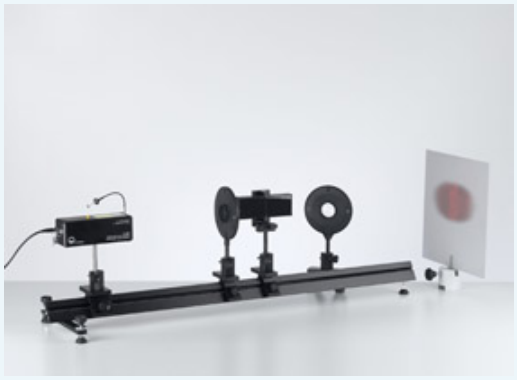
P3.4.5.7 | Year 1 / 2

Transformer and turns ratio

Study induced voltage, turns ratio and transformer loading.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Faraday induction; voltage transformation; losses and load behaviour.





P5.3.2.1 | Year 2

Fresnel mirror interference

Generate two coherent virtual sources and measure interference fringes.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Coherence; superposition; wavelength determination; alignment technique.

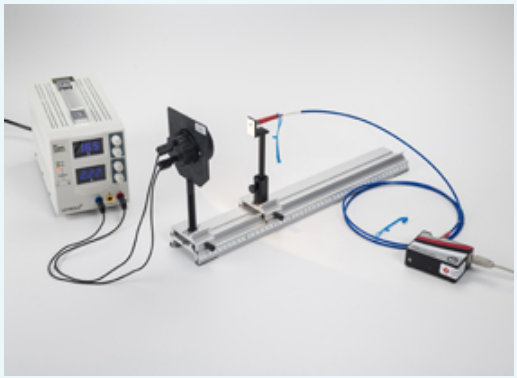
Available experiment examples

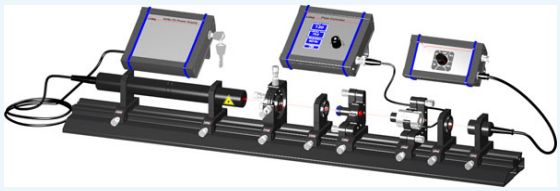
P5.5.2.4 | Year 2

Wien’s displacement law

Measure the spectral distribution of thermal radiation at different temperatures.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Blackbody radiation; wavelength of maximum intensity; temperature dependence.





P5.8.5.4 | Year 2 / advanced

Scanning Fabry–Perot interferometer

Resolve longitudinal modes and investigate optical resonators with a scanning interferometer.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES
Interference order; free spectral range; mode structure; piezo scanning.

Available experiment examples

P1.1.2.3 | Year 1

Density using a pycnometer

Determine liquid density precisely with a Gay-Lussac pycnometer.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Mass and volume; calibration; temperature effects; uncertainty and comparison of liquids.





P1.8.2.1 | Year 1

Archimedes’ principle

Confirm buoyancy by comparing displaced-liquid weight with the apparent loss of weight.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Hydrostatic force; displaced volume; density; equilibrium and measurement uncertainty.

Available experiment examples

P2.3.3.1 | Year 1 / 2

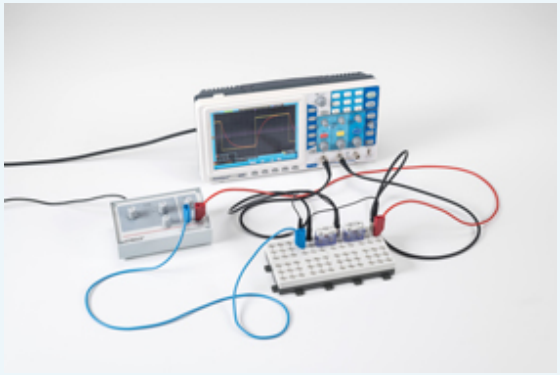
Mechanical equivalent of heat

Convert mechanical work into thermal energy and compare both energy quantities.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Energy conservation; friction work; calorimetry; heat capacity and efficiency.





P3.6.1.1 | Year 1 / 2

RC charging and discharging

Observe capacitor voltage during switching and determine the circuit time constant.

EXPERIMENT EXAMPLES / LEARNING OUTCOMES

Exponential response; time constant; oscilloscope measurement; resistor and capacitor dependence.

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