

# Fundamentals of Electrical Engineering Courseware

OP1110



"This courseware helps students to master the fundamentals of Electrical engineering, namely, electric circuits, passive elements, transformers, dc and ac sources, steady-state and transient analysis, instantaneous, mean, and RMS values, balanced and unbalanced systems, etc."

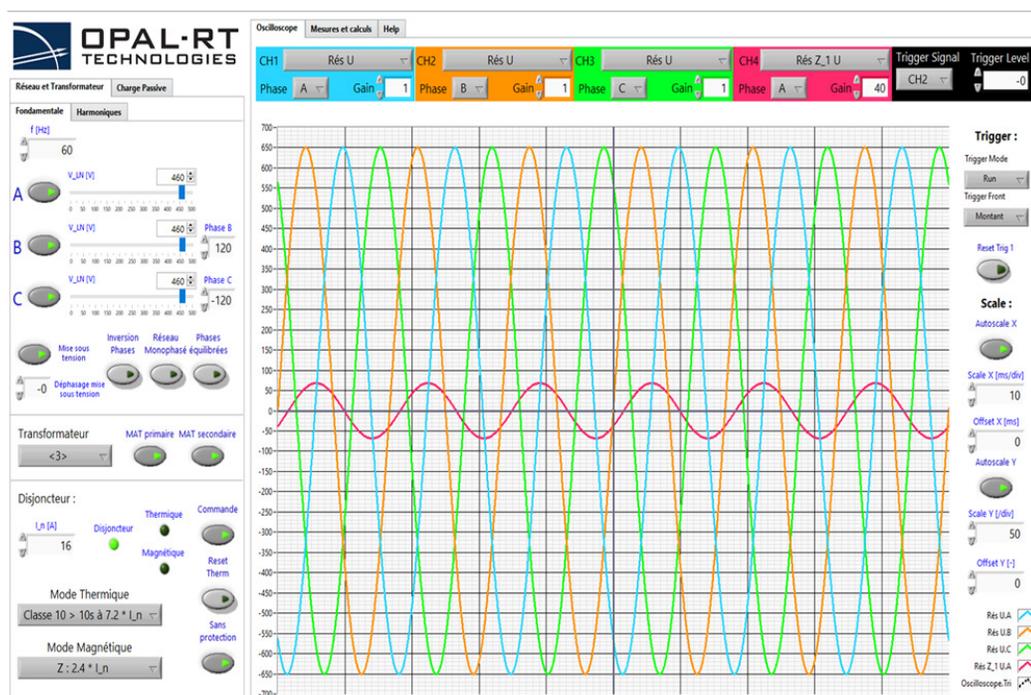
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The courseware is intended to teach the fundamentals of electric engineering to universities' undergraduates and colleges' students. Students are in the loop, interacting with a real-time virtual laboratory, where various tests and experiments on electric circuits can be performed beyond those of a physical workbench. As a result, they will fully grasp the fundamental notions of electric circuit theory, upon which are based advanced topics, such as measurement & instrumentation, electronics, electric machines, and power systems.

## MAIN BENEFITS

- An interactive user interface brings students into the loop and allows them to perform various tests on transformers and passive loads.
- A virtual four-channels oscilloscope, reproducing exactly the operations that can be executed on a real scope, thus allowing students to master all the measurements and observation functionalities.
- Experience the true dynamics of electric circuit models that can be too difficult or too expensive to realize in a real test bench.

## INTERACTIVE PANEL



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## FUNDAMENTALS OF ELECTRICAL ENGINEERING LEARNING OUTCOMES

**Measurement and Instrumentation:** Understand scope functionalities such as trigger, x- and y-scale, offset, gains. Learn the various measurements applied to electric signals: RMS, max, mean. Use virtual voltmeter, amp meter and watt meter. Compute power factor. Achieve harmonic and Fourier analysis.

**Electric Circuits Components and Configurations:** Get familiar with DC- and AC- sources that can be single- or three-phases. Understand current and voltage equations governing passive elements: resistive, inductive, and capacitive. Learn about various connections topologies: series, parallel, delta, wye, and combination of all. Test short- and open-circuits.

**Electric Engineering Systems:** Understand single-phase and three-phase, balanced and unbalanced, grounded and ungrounded systems. Learn about transient, steady-state and phasors. Compute and apply power factor compensation.

**Electric Transformers:** Understand single- and three-phases transformers. Identify the parameters by performing no-load and short-circuit tests. Measure and observe the saturation. Learn about various connections topologies at primary and secondary circuits: wye-delta connection, alphanumeric code.

