

# Low-Cost Transmission Line Demonstrator for a Novel Intermediate-Level Communication Engineering Laboratory

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*Index Terms*—Education, impedance, laboratory, microwaves, propagation, transmission lines.

## I. SUMMARY

This paper describes a transmission line laboratory for intermediate-level communication engineering students, within a course on Radiation and Guided Waves. The measurement setup uses low-cost standard instrumentation, available in any basic electronic laboratory. Both time domain reflectometry and sinusoidal steady-state measurements are used to characterize a coaxial line. However, discussions are mainly focused on sinusoidal measurements. The experimental work undertaken by the students gives them insight into main transmission line parameters and features: characteristic impedance, propagation speed, behavior as an impedance transformer, the complex nature of the measured magnitudes, the standing wave behavior of voltage, and attenuation.

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