

COMPETENCY PROFILE



ALTERNATE CURRENT I (AC 1)

BTC: ELTR 110 (78 clock hours/4 credits)

An introduction and examination of the principles and applications of alternating current, including frequency, reactance, impedance, and resonance. Measurements of the AC circuits and oscilloscope usage.

Upon completion of high school equivalent courses, the student will be able to:

- Explain the difference between peak, average, and RMS measurements.
 - Explain the meaning of "phase" in an AC circuit, and the phase angle between two waveforms
 - Determine the period and frequency of a waveform that is displayed on an oscilloscope.
 - Define and identify each of the following magnitude-related values: peak, peak-to-peak, instantaneous, full-cycle average, and half-cycle average.
 - Demonstrate the use of multimeters to measure voltage and current in AC circuits.
 - Demonstrate the use of a function generator to create AC waveforms.
 - Demonstrate the use of an oscilloscope to measure AC amplitude and frequency.
 - Calculate inductive reactance in an AC circuit.
 - Calculate capacitive reactance in an AC circuit.
 - Calculate the value of a capacitor from measurements of voltage, current, and frequency in an AC circuit.
 - Calculate the value of an inductor from measurements of voltage, current, and frequency in a series or parallel resonant LC, and RLC circuit.
 - Design a low-pass or high-pass filter circuit using either inductors or capacitors.
 - Identify (and solve for) each of the following on a frequency response curve: bandwidth, center frequency, lower cutoff frequency, and upper cutoff frequency.
 - Discuss the relationship among filter Q, bandwidth, center frequency, and average frequency.
 - Predict the effects of specific component failures in AC circuits.
 - Demonstrate proficiency with industry standard notations through the use of proper units of measurement, metric prefixes and schematic diagram creation.
 - Logically troubleshoot a mixed-signal AC circuit using appropriate test equipment.
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College Textbooks:

- 📖 Electronics Technology Fundamentals (conventional flow version), by Paynter and Boydell.
- 📖 Textbook (supplement) -- Lessons in Electric Circuits, Volume 2 (AC), by Tony R. Kuphaldt.
Or access online: <<http://ibiblio.org/obp/electricCircuits/AC>>

This document is to certify this student has completed the required coursework as defined by the Whatcom County Tech Prep Articulation Agreement and has demonstrated mastery for college credit. Further information about any aspect of this program may be obtained by contacting the school and instructor named on this profile.