COMPETENCY PROFILE

DIRECT CURRENT II (DC 2)

BTC: ELTR 105 (75 clock hours/4 credits)

This course continues the development of a working knowledge of DC electronics by applying the; Faraday's law, Lenz' law, Thevenin, Norton, and Maximum power transfer theorems. The purpose and operation of such devices as resistors, capacitors, inductors and meters are covered in labs and theory.

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

- Calculate voltages, currents, resistances, and power dissipations in series-parallel combination circuits.
- Describe the construction and operation of variable voltage, and current divider.
- Describe the construction and operation of the Wheatstone bridge as well as the use
- Demonstrate the use of multimeters to measure voltage, current, and resistance in DC circuits.
- Describe the form of a Thevenin and Norton equivalent circuits.
- Obtain the Thevenin equivalent voltage source and equivalent resistance.
- Obtain the Norton equivalent current source and equivalent resistance.
- Discuss the maximum power transfer theorem, and calculate the maximum load power for a given series circuit.
- Demonstrate and explain the complementary principles of electromagnetism and electromagnetic induction.
- Contrast the following: magnetic fields, magnetic flux, and flux density.
- Define and discuss hysteresis, retentivity and reluctance.
- Explain the concept of counter emf by applying the Lenz's law
- Describe the construction and operation of an electromechanical relay and solenoid.
- Explain the operation of a DC electric motor.
- Explain the operation of a DC electric generator.
- Calculate resistance values required to scale an analog meter for different DC voltages and DC currents.
- Relate the theoretical concepts of electromagnetism and electromagnetic induction to inductor function.
- Define capacitance, and describe the physical makeup of a capacitor and it unit of measure.
- Calculate all voltages and currents in a DC circuit containing capacitors or inductors, given a time reference in term of time constant.
- Predict the effects of specific component failures in DC circuits.
- Determine which component has failed in a simple DC circuit, given a schematic diagram and descriptions of abnormal circuit behavior.
- Demonstrate proficiency with industry standard notations through the use of proper units of measurement, metric prefixes, and schematic diagram creation.
- Describe several DC sources and solve circuit problems with multiple DC sources.
- Logically troubleshoot a malfunctioning voltage divider circuit using appropriate test equipment.

College Textbooks:

📖 Electronics Technology Fundamentals (conventional flow version), by Paynter and Boydell

📖 Textbook (supplement) -- Lessons in Electric Circuits, Volume 1 (DC), by Tony R. Kuphaldt.
Or access online: <http://ibiblio.org/obp/electricCircuits/DC>

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.

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