



**BAKER COLLEGE**  
**STUDENT LEARNING OUTCOMES**

**MATT1150 Electrical Technology and Circuits**

**4 Semester Credit Hours**

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**Student Learning Outcomes and Enabling Objectives**

1. Use the fundamental 'building blocks' of electricity and circuitry.
  - a. Describe basic electrical quantities: voltage, charge, current, resistance, conductance, capacitance, energy, power, and the physical significance of each.
  - b. Define units of measurement in the SI system for these quantities: volts, coulombs, amperes, ohms, Siemens, farads, joules, and watts.
  - c. Describe inductance and its unit of measurement.
  - d. Describe physical characteristics of inductors.
2. Describe electronic devices such as diodes, transistors, thermistors, and op-amps.
  - a. Describe the properties of semiconductors.
  - b. Describe the pn junction: forward and reverse bias.
  - c. Interpret the operational modes of bipolar transistors: linear, saturation, cutoff.
  - d. Interpret the operation of field-effect transistors: enhancement mode, depletion mode, and ohmic region cutoff.
3. Identify and use nomenclature common in electrical work.
  - a. Number formats, metric prefixes, and SI units.
  - b. Electrical symbols for simple schematic diagrams.
4. Solve series-parallel DC circuits for all voltages and currents.
  - a. By applying Ohm's Laws and Watt's Laws.
  - b. By applying Kirchhoff's Voltage and Current Laws.
  - c. Using voltage division and current division.
5. Simplify DC networks.
  - a. By calculating their Thevenin equivalent circuits.
  - b. By decomposing series-parallel circuits to a single equivalent resistance.
6. Define the characteristics of a sine wave.
  - a. Amplitude, peak-to-peak, rms, and average values.
  - b. Frequency, wavelength, and period.
  - c. Phase.
7. Solve series and parallel circuits containing energy storage elements.
  - a. First-order circuits with resistors and either capacitors or inductors.

- b. Second-order resonant circuits with a resistor, capacitor, and inductor.
    - a. Reactance, phase angle, total impedance, corner and center frequencies, and resonant Q.
    - b. voltage and current waveforms.
  - 8. Demonstrate proper use of electronics equipment.
    - a. Wiring breadboards and reading circuit schematics.
    - b. Sources such as DC power supplies and function generators.
    - c. Measurement equipment such as digital multi-meters and oscilloscopes.
  - 9. Simulate circuits using software.
    - a. Create circuit schematic.
    - b. Measure and analyze simulated circuit performance.
  - 10. Create wire diagrams and schematics according to standards of product/process requirements (LAB).
    - a. Construct manually and/or in Auto CAD.
    - b. Modify drawing to improve quality and efficiency.
  - 11. Identify electrical components.
    - a. By alphanumeric codes and color codes.
    - b. By reference or polarity marks.
    - a. By data sheet pin-out diagrams.
  - 12. Write professional laboratory reports using quality technical writing skills.
    - a. Create well-formatted and -labelled graphs and diagrams.
    - b. Compose clear, technically sound reports using conventional engineering nomenclature.
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These SLOs are approved for experiential credit.

**Effective: Spring 2021**