



Experiential Learning Portfolio for 32605371 Broadband Electricity

Student Contact Information:

Name: _____ Student ID# _____

Email: _____ Phone: _____

It is highly recommended that you speak with the Academic Dean or instructor who teaches this course prior to completing a portfolio.

Directions

Consider your prior work, military, volunteer, education, training and/or other life experiences as they relate to each competency and its learning objectives. Courses with competencies that include speeches, oral presentations, or skill demonstrations may require scheduling face-to-face sessions. You can complete all of your work within this document using the same font, following the template format.

1. Complete the Student Contact Information at the top of this page.
2. Write an Introduction to the portfolio. Briefly introduce yourself to the reviewer summarizing your experiences related to this course and your future goals.
3. Complete each "Describe your learning and experience with this competency" section in the space below each competency and its criteria and learning objectives. Focus on the following:
 - What did you learn?
 - How did you learn through your experience?
 - How has that learning impacted your work and/or life?
4. Compile all required and any suggested artifacts (documents and other products that demonstrate learning).
 - Label artifacts as noted in the competency
 - Scan paper artifacts
 - Provide links to video artifacts
 - Attach all artifacts to the end of the portfolio
5. Write a Conclusion for your portfolio. Briefly summarize how you have met the competencies.
6. Proofread. Overall appearance, organization, spelling, and grammar will be considered in the review of the portfolio.
7. Complete the Learning Source Table. Provide additional information on the business and industry, military, and/or volunteer experiences, training, and/or education or other prior learning you mentioned in your narrative for each competency on the Learning Source Table at the end of the portfolio. Complete this table as completely and accurately as possible.

The portfolio review process will begin when your completed portfolio and Credit for Prior Learning Form are submitted and nonrefundable processing fees are paid to your local Credit for Prior Learning contact. Contact Student Services for additional information.

Your portfolio will usually be evaluated within two weeks during the academic year; summer months may be an exception. You will receive an e-mail notification regarding the outcome of the portfolio review from the Credit for Prior Learning contact. NOTE: Submission of a portfolio does not guarantee that credit will be awarded.

You have 6 weeks to appeal any academic decision. See your student handbook for the complete process to appeal.

To receive credit for this course, you must receive “Met” on 10 of the 12 competencies.

32605371 Broadband Electricity, 4 Technical Diploma Credits

Course Description: This course is an introduction to the basic concepts, principles, and theories of AC and DC electricity, including the analysis of circuits to learn the relationship of current, voltage, and resistance. Knowledge and use of test equipment will focus on multimeters and signal generators. Series and parallel circuits will be explored using a digital electronics trainer and computer assisted instruction (CAI).

Introduction: **Briefly introduce yourself to the reviewer summarizing your experiences related to this course and your future goals.**

Competency 1: Follow national, state, and local industry established safety procedures

Criteria: Performance will be satisfactory when:

- demonstration includes location of a first-aid kit in their working environment
- demonstration includes OSHA-certified eye, hand, foot, and head protection when applicable

Learning Objectives:

- a. Recognize potential dangers when working in and around electricity and electronic devices
- b. Describe first-aid responsibilities
- c. Develop good personal and laboratory safety habits

Required Artifacts: None
Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 2: Use established symbols, standards, conventions, and terminology

Criteria: Performance will be satisfactory when:

- learner matches electronic schematic symbols in circuit diagram to legend of components
- learner applies color code to resistive component identification
- learner identifies correct component to use in circuit for protection purposes
- learner identifies correct component to use in circuit for current flow

Learning Objectives:

- a. Identify electronic components as represented in schematic diagrams
- b. Describe a basic electric circuit with load and the schematic diagram which represents it
- c. Identify a resistor and its purpose
- d. Define tolerance, accuracy, and precision as they relate to resistors
- e. Identify the different types of switches and their schematic symbols
- f. Identify a fuse, its schematic symbol, and purpose
- g. Identify a circuit breaker, its schematic symbol, and purpose

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 3: Express numbers using scientific notation and metric prefixes

Criteria: Performance will be satisfactory when:

- learner matches engineering notation powers of ten to the standard metric prefix and symbol for each, used in electronics applications
- learner converts a quantity written in scientific notation to a standard metric prefix for electronic applications

Learning Objectives:

- a. Convert decimal numbers to numbers expressed in powers of ten and back again to decimal numbers
- b. Convert decimal numbers to numbers expressed with metric prefixes and back again to decimal numbers
- c. Perform addition, subtraction, multiplication, and division of numbers expressed in powers of ten and metric prefixes

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 4: Demonstrate the proper use of laboratory training equipment

Criteria: Performance will be satisfactory when:

- demonstration includes the initial startup conditions on the electronics trainer
- demonstration includes the operation of a variety of 130E circuit experiment cards

Learning Objectives:

- a. Identify the main features and the purpose of the NIDA 130A training equipment
- b. Describe the location and functions of controls, indicators, and connectors on the NIDA 130A Test Console
- c. Prepare the NIDA 130E Test Console for an experiment by following the steps in the Pre-start Checklist
- d. Describe a typical 130 Experiment Card
- e. Perform a basic experiment, using NIDA 130E training equipment

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 5: Explain the principles of magnetism and electromagnetism as they relate to electrical circuits

Criteria: Performance will be satisfactory when:

- learner draws symbolic magnetic flux lines around a permanent bar magnet indicating flux line polarity and pole location
- learner applies the right-hand rule for conductors and coils

Learning Objectives:

- a. Define magnetism and state the Law of Magnetic Force
- b. Identify magnetic materials, nonmagnetic materials, and magnetic alloys
- c. Describe a magnetic field and the magnetic lines of force
- d. Describe an electromagnet and explain the relationship between the electron flow and the magnetic field around the conductor
- e. Define magnetomotive force and saturation point in relation to electromagnets

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 6: Demonstrate the proper use of multimeters for the purpose of measuring voltage, current, and resistance of electrical circuits

Criteria: Performance will be satisfactory when:

- demonstration includes appropriate choice of equipment settings for measuring electrical quantities
- demonstration includes measurement of electrical quantities with both analog and digital multimeters
- demonstration includes proper lead placement for measurements

Learning Objectives:

- a. Describe how magnetism works in a relay circuit and in the basic meter movement
- b. Describe a typical multimeter and its purpose
- c. Explain the difference between analog and digital multimeters and the advantages and disadvantages of each
- d. Operate typical analog and digital multimeters
- e. Identify chassis ground, earth ground, and common in an electrical system and the schematic symbol
- f. Measure DC and AC voltages with respect to a common potential or voltage using both digital and analog multimeters
- g. Measure DC and AC currents in electrical circuits using both digital and analog multimeters
- h. Perform continuity checks with both analog and digital multimeters
- i. Measure resistance in electrical circuits using both analog and digital multimeters

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 7: Analyze voltage, current, resistance, and power relationships of simple circuits using Ohm's and Watt's Laws

Criteria: Performance will be satisfactory when:

- learner calculates to find voltage, current, and resistance in a simple resistive circuit
- learner calculates power in a simple resistive circuit
- learner measures values for voltage, current, and resistance to verify calculated values
- learner selects proper wire gauge using Ohm's Law

Learning Objectives:

- a. State Ohm's Law
- b. Define the relationship between current, voltage, and resistance
- c. Solve problem for unknown quantities of current, voltage, and resistance using Ohm's Law
- d. Define power in an electrical circuit in terms of current and voltage
- e. Demonstrate the ability to use Ohm's law with circuit measurements

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 8: Apply logical approaches to troubleshooting practices and problems

Criteria: Performance will be satisfactory when:

- learner accurately describes the malfunction of simple electronic circuits
- learner interprets test equipment readings to determine choice of subsequent test or cause of defect
- learner troubleshoots a simple DC electrical circuit
- learner follows industry standards for outside plant construction

Learning Objectives:

- a. Diagnose a faulted RC circuit
- b. Troubleshoot a faulted RC circuit
- c. Diagnose a faulted RL circuit
- d. Troubleshoot a faulted RL circuit
- e. Diagnose a faulted RCL circuit
- f. Troubleshoot a faulted RCL circuit

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 9: Describe AC voltages and the characteristics of AC voltage sources

Criteria: Performance will be satisfactory when:

- learner lists sources of AC voltages
- learner converts frequency to time and time to frequency
- learner labels all values within one cycle of an AC waveform
- learner calculates peak, peak-to-peak, RMS, and average values on an AC sinewave

Learning Objectives:

- a. Define alternating current
- b. Determine frequency, cycle, period, and wavelength of a sine wave
- c. Calculate peak, peak-to-peak, average, and rms values of AC voltage
- d. Identify harmonic frequencies
- e. Identify square waves and sawtooth waves
- f. Use Ohm's Law to analyze AC circuits containing resistive components

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 10: Demonstrate the proper use of AC test equipment for the purpose of measuring AC voltage waveforms

Criteria: Performance will be satisfactory when:

- demonstration includes measuring DC/AC voltage quantities with an oscilloscope
- demonstration includes measuring the period of an AC waveform using an oscilloscope
- demonstration includes verifying AC frequencies with frequency counter
- demonstration includes selecting appropriate ranges and controls on a function/signal generator and oscilloscope

Learning Objectives:

- a. Describe a typical oscilloscope and its purpose
- b. Set up an oscilloscope to observe waveforms, measure DC and AC voltages, measure the frequency of a sine wave, and determine the phase relationship between two waveforms
- c. Describe a typical Function Generator and its purpose
- d. Describe the purpose and function of the various controls and how they affect the operation of the Function Generator
- e. Describe a typical Frequency Counter and its purpose
- f. Identify the controls of a Frequency Counter and their purpose

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 11: Analyze capacitors and capacitance in electrical circuits

Criteria: Performance will be satisfactory when:

- learner describes plate area, plate separation, and dielectric strength as it relates to capacitors
- learner calculates voltage drops, total capacitance, and capacitive reactance in series and parallel circuits

Learning Objectives:

- a. Identify the operational characteristics of a capacitor
- b. Define capacitive reactance
- c. Determine current, voltage, impedance, and power in an RC series circuit
- d. Measure the phase between voltage and current across a capacitor
- e. Measure circuit values in an RC series circuit
- f. Determine current, voltage, impedance, and power in an RC parallel circuit
- g. Measure the phase between voltage and current across a capacitor
- h. Measure circuit values in an RC parallel circuit

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 12: Analyze inductors and inductance in electrical circuits

Criteria: Performance will be satisfactory when:

- learner describes the construction of an inductor
- learner calculates voltage drops, total inductance, and inductive reactance in series and parallel circuits

Learning Objectives:

- a. Identify the operational characteristics of an inductor
- b. Define inductive reactance
- c. Determine current, voltage, impedance, and power in an RL series circuit
- d. Measure the phase between voltage and current across an inductor
- e. Measure circuit values in an RL series circuit
- f. Determine current, voltage, impedance, and power in an RL parallel circuit
- g. Measure the phase between voltage and current across an inductor
- h. Measure circuit values in an RL parallel circuit

Required Artifacts: None

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

