Electronics / Electrical Engineering CTAG Alignments

1. CTEET001 DC Circuits The CTAN number is CTEET001 005 – DC Circuits

Semester Credit Hours: 3

Course Description: OET001/CTEET001 The course covers the analysis of networks with resistive loads, the transient response to capacitive and inductive networks, and an introduction to instruments. Laboratory activity will include verification of circuit analysis methods by circuit construction and electrical measurement. Lab report writing is emphasized.

Advising Notes: Submitted course work or content must include proof of laboratory component. Student must access credit within 3 years of program completion or within currency of certificate. This is a shared course with TAG course OET001.

Prerequisite: College Algebra. Career-technical students from CT² approved institutions will not receive credit or credit hour value for DC Circuits until he/she has completed the requirement for College Algebra at the matriculating institution.

For CTAG credit, please consult the CTAG Rubric for DC Circuits developed by the OETEA. This document will help both instructors and students understand the level to which the CTAG learning outcomes should be taught and understood.

Alignment: CTEET001 – DC Circuits

Learning Outcomes The student will be able to:	**Outcomes and/or Competencies in ODE's REVISED Career Field Technical Content Standards**
1. Electrical components and quantities.*	2.1.1. Describe the structure of atoms and their relationship to electricity. 2.1.3. Explain methods of producing electrical current. 2.1.4. Explain how batteries store and disperse energy. 2.1.5. Compare and contrast alternating current (AC) and direct current (DC). 2.4.1. Identify resistor values from color codes or other marks.

	2.4.2. Compare and contrast resistor compositions and their uses. 2.4.3. Identify symbols for electronic components.
2. Definitions of voltage, current, electrical resistance and power.*	2.1.3. Explain methods of producing electrical current. 2.1.4. Explain how batteries store and disperse energy. 2.1.5. Compare and contrast alternating current (AC) and direct current (DC). 2.1.6. Define the units of measurement for voltage, current, power, and resistance. 2.1.7. Describe the relationships between voltage, current, resistance, and power in circuits.
3. Ohm's Law, electrical energy and power, Kirchhoff's Laws.*	2.1.8. Determine voltage, current, resistance, and power in circuits using Ohm's Law, Kirchhoff's Law, and Watt's Law.
4. Series circuit analysis.*	2.1.8. Determine voltage, current, resistance, and power in circuits using Ohm's Law, Kirchhoff's Law, and Watt's Law. 2.2.8. Explain the uses of series, parallel, and series-parallel circuits. 2.2.9. Construct and troubleshoot series, parallel, and series-parallel circuits.
5. Parallel circuit analysis.*	2.1.8. Determine voltage, current, resistance, and power in circuits using Ohm's Law, Kirchhoff's Law, and Watt's Law. 2.2.8. Explain the uses of series, parallel, and series-parallel circuits. 2.2.9. Construct and troubleshoot series, parallel, and series-parallel circuits.

6. Series-parallel circuit analysis.*	2.1.8. Determine voltage, current, resistance, and power in circuits using Ohm's Law, Kirchhoff's Law, and Watt's Law. 2.2.8. Explain the uses of series, parallel, and series-parallel circuits. 2.2.9. Construct and troubleshoot series, parallel, and series-parallel circuits.
7. Circuit theorems (such as superposition, Thevenin's and Norton's theorems).*	2.1.8. Determine voltage, current, resistance, and power in circuits using Ohm's Law, Kirchhoff's Law, and Watt's Law.
8. Mesh and/or nodal analysis techniques.*	2.1.8. Determine voltage, current, resistance, and power in circuits using Ohm's Law, Kirchhoff's Law, and Watt's Law.
9. Properties of capacitors and their behavior under DC conditions.*	2.1.11. Identify methods of varying capacitance. 2.2.5. Identify types of capacitors and common usages for each.
10. Properties of inductors and their behavior under DC conditions.*	2.2.7. Identify the function of inductors and capacitors in series and parallel circuits.

2. CTEET002 – Digital Electronics: CTAN alignment with the Tech Prep Manufacturing Production Pathway in the Career Field Technical Content Standards of the Ohio Department of Education. This CTAN is already an approved CTAN in the Electrical Engineering Technology CTAG. The number and title are: CTEET002 – Digital Electronics.

Semester Credit Hours: 4

Advising Notes: Submitted course work must include proof of laboratory component. This is a shared course with TAG course OET002

For CTAG credit, please consult the TAG Rubric for Digital Electronics developed by the OETEA. This document will help both instructors and students understand the level to which the CTAG learning outcomes should be taught and understood.

Course Description: Digital Electronics OET002/CTEET002: Introduces students to computer-based number systems, symbolic logic concepts, Boolean Algebra, logic devices, and basic logic circuits. Logic circuits are analyzed using truth tables and timing diagrams. Laboratory work will demonstrate and verify the principles studied in the classroom.

Alignment:

Learning Outcomes The student will be able to:	**Outcomes and/or Competencies in ODE's REVISED Career Field Technical Content Standards**

1. **Number Systems, operations and codes***	2.6.10 Identify the numbering systems, codes, arithmetic operations, Boolean operations, and simplification methods used in digital electronics.
2. Logic Gates*	2.6.2. Describe the purpose and use of logic gates (e.g., discrete and medium scale integration [MSI] gates, latches, flip-flops).

3. Boolean algebra*	2.6.10. Identify the numbering systems, codes, arithmetic operations, Boolean operations, and simplification methods used in digital electronics.
4. DeMorgan's theorem and logic simplification*	2.6.2. Describe the purpose and use of logic gates (e.g., discrete and medium scale integration [MSI] gates, latches, flip-flops). 2.6.10 Identify the numbering systems, codes, arithmetic operations, Boolean operations, and simplification methods used in digital electronics. 2.6.18 Use the Boolean Algebra laws and DeMorgan's Theorem in the simplification of logic circuits.
5. Combination logic circuits*	2.6.3. Design a paradigm for combinational logic problems.
6. Encoders / decoders*	2.6.3 Design a paradigm for combinational logic problems. 2.6.4. Design a specific MSI gate application
7. Multiplexers / demultiplexers*	2.6.3 Design a paradigm for combinational logic problems. 2.6.4 Design a specific MSI gate application
8. Adders, subtractors, and ALUs*	2.6.3 Design a paradigm for combinational logic circuits. 2.6.4 Design a specific MSI gate application
9. Flip-flops and related devices*	2.6.2 Describe the purpose and use of logic gates (e.g., discrete and medium scale integration [MSI] gates, latches, flip-flops).

10. Counters*	2.6.6 Describe the purpose and use of asynchronous and synchronous counters. 2.6.13 Utilize counters and shift registers in a circuit.
11. Shift registers*	2.6.13 Utilize counters and shift registers in a circuit.
12. Memory and Storage*	2.6.14 Utilize memory in a control system.
13. Integrated circuit technologies*	2.6.7 Determine fan-out and propagation delays
	2.6.11 Describe the purpose and use of digital-to-analog and analog-to-digital circuits. 2.6.12 Design a schematic for a digital circuit. 2.6.15 Construct a digital circuit based on the schematic using solder and solderless techniques.
14. VHDL Topics	2.6.5 Describe the purpose and operation of programmable logic devices (PLDs) and complex programmable logic devices (CPLDs).
15. Introduction to microprocessors, computers and buses	2.6.8 Explain the purpose and use of a digital bus. 2.6.9 Explain the purpose and use of pulsers and logic probes.
16. Introduction to digital signal Processing	2.6.8 Explain the purpose and use of a digital bus. 2.6.9 Explain the purpose and use of pulsers and logic probes.

17. Digital communications and transmission standards	2.6.11 Describe the purpose and use of digital-to-analog and analog-to-digital circuits. 2.6.12 Design a schematic for a digital circuit. 2.6.8 Explain the purpose and use of a digital bus. 2.6.9 Explain the purpose and use of pulsers and logic probes. 2.6.15 Construct a digital circuit based on the schematic using solder and solderless techniques. 2.6.16 Test circuit function. 2.6.17 Use schematics and test points to locate subsystem, component, and wiring failures, in electronics products.

*Asterisked learning outcomes are essential per the TAG

*Revised 8/13/21