North Central State College

MASTER SYLLABUS
2018-2019

A. Academic Division: Business, Industry, and Technology

B. Discipline: Electronic Engineering Technology

C. Course Number and Title: ELET1510 DC Electricity

D. Course Coordinator: Jonathan DeWitt
Assistant Dean: Toni Johnson, PhD

Instructor Information:
- Name: Click here to enter text.
- Office Location: Click here to enter text.
- Office Hours: Click here to enter text.
- Phone Number: Click here to enter text.
- E-Mail Address Click here to enter text.

E. Credit Hours: 3
Lecture: 2 hours
Laboratory: 2 hours

F. Prerequisites: None
Co-requisite(s): MATH1110

G. Syllabus Effective Date: Fall, 2019

H. Textbook(s) Title:

Foundations of Electronics Circuits & Devices Electron Flow Version
- Author(s): Meade
- Copyright Year: 2006
- Edition: 5th
- ISBN #: 978-1418-0053-75

I. Workbook(s) and/or Lab Manual:

Laboratory Projects to Accompany Foundations of Electronics
- Author(s): Meade
- Copyright Year: 2006
- Edition: 5th
- ISBN #: 978-1418-0418-30

J. Course Description: DC Electricity is an introductory course in direct current circuit theory that includes the basic concepts of voltage, current, resistance and power. This curriculum has been previously approved under the Ohio Board of Regents Career Technical Credit Transfer guide (CTAG) and the Transfer Agreement Guide (TAG) as CTEET001 and OET 001 respectively. *No changes have been made to the outcomes based on these requirements*.

K. College-Wide Learning Outcomes

College-Wide Learning Outcome	Assessments - - How it is met & When it is met
Communication – Written	
Communication – Speech	
Intercultural Knowledge and Competence	
Critical Thinking	
Information Literacy	
Quantitative Literacy	

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Demonstrate knowledge in the areas of basic electronics units of measure	Lecture, Labs, and Quizzes during the first two weeks and throughout the remainder of the semester.
2. Identify and explain the symbology used in electronic diagrams	Lecture, Labs, and Quizzes in weeks 2, 3, and 4 and throughout the remainder of the semester..
3. Use meters to safely measure V, I, and R values.	Lecture, Labs, and Quizzes in week 2 and throughout the remainder of the semester.
4. Demonstrate knowledge and use of the resistor color code.	Lecture, Labs, and Quizzes in week 2 and throughout the remainder of the semester.
5. Analyze and calculate fundamental electronic circuit configurations using Ohm's Law and power formulas	Lecture, Labs, and Quizzes in weeks 3 and 4 and throughout the remainder of the semester.
6. Analyze and calculate V, I, and R in series, parallel, and series-parallel circuits.	Lecture, Labs, and Quizzes during weeks 4 through 7 and throughout the remainder of the semester.
7. Demonstrate the ability to use Norton's and Thevenin's theorems to solve circuit problems.	Lecture, Labs, and Quizzes during week 7.
8. Demonstrate the ability to use nodal analysis to solve circuit problems.	Lecture, Labs, and Quizzes during week 8.
9. Explain and use magnetic terms and units of measure.	Lecture, Labs, and Quizzes during week 9.
10. Define the properties of capacitance and the behavior of capacitors in DC circuits.	Lecture, Labs, and Quizzes during weeks 9 and 10.

M. Topical Timeline (Subject to Change):

Electrical Quantities, Components, and Concepts

Week 1

- Define the term matter and list its physical and chemical states
- Describe the difference between elements and compounds
- Discuss the characteristics and structure of an atom, molecule, and ion
- Define the electrical characteristics of an electron, proton, and neutron
- Explain valence electrons and free electrons
- Describe the characteristics of conductors, semiconductors, and insulators
- State the law of electrical charges
- Discuss the terms polarity and reference points

- Define charge and its unit of measure, coulomb
- Define potential (emf) and give its unit of measure
- Define current and explain its unit of measure
- Calculate current when magnitude and rate of charge motion is known

Week 2

- Define resistance and give its unit of measure
- List the typical elements of an electrical circuit
- Describe the difference between closed and open circuits
- List the units of measure for charge, potential (emf), current, resistance, and conductance and give the appropriate abbreviations and symbols for each
- Use metric system terms and abbreviations to express subunits or multiple units of the primary electrical units
- List the factors that affect the resistance of a conductor
- Recognize common types of conductors
- Use a wire table to find conductor resistance for given lengths
- Recognize and/or draw the diagrammatic representations for conductors that cross and electrically connect, and that cross and do not connect
- Define the term superconductivity
- Give the characteristics of several common types of resistors
- Explain the characteristics of surface-mount "chip" resistors

Week 3

- Use the resistor color code
- Use other special resistor coding systems
- Explain how to connect meters to measure voltage, current, and resistance
- Recognize and/or draw the diagrammatic symbols for elemental electronic components or devices
- Interpret basic facts from block and schematic diagrams
- List key safety habits to be used in laboratory work

Week 4

- Basic Circuit Analysis
- Explain the relationships of current, voltage, and resistance
- Use Ohm's Law to solve for unknown circuit values
- Illustrate the direction of current flow and polarity of voltage drops on a schematic diagram
- Use metric prefixes and powers of 10 to solve Ohm's Law problems
- Use a calculator to solve circuit problems
- Use a computer spreadsheet program to solve circuit problems
- Explain power dissipation
- Use appropriate formulas to calculate values of power

Week 5

- Define the term series circuit
- List the primary characteristics of a series circuit
- Calculate the total resistance of series circuits using two different methods
- Calculate and explain the voltage distribution characteristics of series circuits
- State and use Kirchhoff's voltage law

Week 6

- Calculate power values in series circuits
- Explain the effects of opens in series circuits
- Explain the effects of shorts in series circuits
- List troubleshooting techniques for series circuits
- Series-connect voltage sources for desired voltages
- Analyze a voltage divider with reference points
- Calculate the required value of a series-dropping resistor
- Use the computer to solve circuit problems

Week 7

- Define the term parallel circuit
- List the characteristics of a parallel circuit
- Determine voltage in parallel circuits
- Calculate the total current and branch currents in parallel circuits
- Compute total resistance and branch resistance values in parallel circuits using at least three different methods

Week 8

- Determine conductance values in parallel circuits
- Calculate power values in parallel circuits
- List the effects of opens in parallel circuits
- List the effects of shorts in parallel circuits
- Describe troubleshooting techniques for parallel circuits
- Use current divider formulas

Week 9

- Define the term series-parallel circuit
- List the primary characteristic(s) of a series-parallel circuit
- Determine the total resistance in a series-parallel circuit
- Compute total circuit current and the current through any given portion of a series-parallel circuit
- Calculate voltages throughout a series-parallel circuit

Week 10

- Determine power values throughout a series-parallel circuit
- Analyze the effects of an open in a series-parallel circuit
- Analyze the effects of a short in a series-parallel circuit
- Explain the loading effects on a series-parallel circuit
- Calculate values relating to a loaded voltage divider
- Make calculations relating to bridge circuits

Week 11

- State the maximum power transfer theorem
- Determine the *RL* value needed for maximum power transfer in a given circuit
- State the superposition theorem
- Solve circuit parameters for a circuit having more than one source
- State Thevenin's theorem

Week 12

- Determine *VL* and *IL* for various values of *RL* connected across specified points in a given circuit or network using Thevenin's theorem
- State Norton's theorem
- Apply Norton's theorem in solving specified problems
- Convert between Norton and Thevenin equivalent parameters
- Use the computer to solve circuit problems
- Define the terms mesh, loop, and node
- Analyze a single-source circuit using a loop procedure
- Use the assumed mesh currents approach to find voltage and current parameters for each component in a network having two sources

Week 13

- Use the nodal analysis approach to find voltage and current parameters for each component in a network having two sources
- Convert from delta (□) circuit configuration parameters to wye (*Y*) circuit configuration
- Use the computer to solve circuit problems
- Basic Producing and Measuring of Electrical Quantities
- Define magnetism, magnetic field, magnetic polarity, and flux
- Draw representations of magnetic fields related to permanent magnets
- State the magnetic attraction and repulsion law
- State at least five generalizations about magnetic lines of force

Week 14

- Draw representations of fields related to current-carrying conductors
- Determine the polarity of electromagnets using the left-hand rule *(right hand rules)*
- List and define at least five magnetic units of measure, terms, and symbols
- Draw and explain a B-H curve and its parameters
- Draw and explain a hysteresis loop and its parameters
- Explain motor action and generator action related to magnetic fields
- List the key factors related to induced emf
- Briefly explain the relationships of quantities in Faraday's Law
- Briefly explain Lenz's Law
- Use the computer to solve circuit problems

Week 15

- List at least two key features of digital multimeters (DMMs)
- Describe at least one advantage and one disadvantage of an analog multimeter (VOM)
- Explain the meanings of the terms autoranging and autopolarity
- Describe and calculate meter loading effects for specified measurement conditions
- List at least two special-purpose measuring devices
- Define two basic methods of measuring voltage on a circuit having a ground reference
- Describe the technique for making continuity checks on a 200-foot-long cable
- Define the purpose and function of meter protection circuits

N. Course Assignments:

1. Class activities and discussions
2. Learning checks
3. Homework
4. Labs
5. Tests
6. Final

O. Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70-72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
00-59	F	0.00	Failure

P. Grading and Testing Guidelines:

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Q. Examination Policy:

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R. Class Attendance and Homework Make-Up Policy:

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S. Classroom Expectations:

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T. College Procedures/Policies:

Important information regarding College Procedures and Policies can be found on the syllabus supplement located at https://sharept.ncstatecollege.edu/committees/1/curriculum/SiteAssets/SitePages/Home/SYLLABUS%20SUPPLEMENT.pdf

The information can also be found Choose an item.