

FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: BCT 1609

COURSE TITLE: DC Theory

PREREQUISITE(S): None

COREQUISITE(S): None

CREDIT HOURS: 3

CONTACT HOURS/WEEK: 5

CONTACT HOUR BREAKDOWN:

Lecture/Discussion:	2
Laboratory:	3

FACULTY WORKLOAD POINTS: 3.5

STANDARDIZED CLASS SIZE ALLOCATION: 24

COURSE DESCRIPTION:

Topics include concepts of work and energy, electrical terminology, Ohms Law, and D.C. circuitry.

SUGGESTED TEXT(S): NCCER Electrical Curriculum, Books I, II, III, IV)
Meade, Russell L., Foundations of Electronics,
Latest Edition, Delmar Publishers

IMPLEMENTATION DATE: Fall Term, 2004 (20051)

REVIEW OR MODIFICATION DATE: Spring Term, 2005 (20062) (was BCT 1958)
Fall Term, 2008 (20091) - Outline Review 2007

COURSE TOPICS	<u>CONTACT HOURS PER TOPIC</u>
I. Concepts	5
A. Work and Energy	
B. Energy Conversion	
C. Structure of Matter	
II. Electrical Terminology	10
A. Conductors	
B. Insulators	
C. Voltage	
(1) Sources	
(2) Values	
(3) Definitions of	
D. Current	
(1) Definitions of	
(2) Values	
E. Resistance	
(1) Definitions of	
(2) Values	
(3) Devices	
III. Ohms Law	10
A. Voltage	
B. Current	
C. Resistance	
D. Formulas	
IV. Power	5
A. Definitions of	
B. Watts	
C. Formulas	
V. Circuits	5
A. Definitions of	
B. Series	
C. Parallel	
D. Combination	
VI. Lab Experiments	20
A. Voltages (19)	
(1) Fixed	
(2) Variable	
B. Circuits (19)	
(1) Series	
(2) Parallel	
(3) Combination	

COURSE TOPICS (Continued)	CONTACT HOURS <u>PER TOPIC</u>
C. Current (19) (1) Amps (2) Mili-amps D. Resistance (19) (1) Ohms (2) Wattage	
VII. Electrical Safety A. Lab B. On-The-Job	5
VIII. Electrical Symbols A. Schematics B. Diagrams	5
IX. Employable Skills A. Dress for Success B. Self Confidence C. Resumes D. Interviews E. Applications	10

PROGRAM TITLE: Construction Electricity Management

COURSE TITLE: DC Theory

CIP NUMBER: 0646030205

LIST PERFORMANCE STANDARD ADDRESSED:

NUMBER(S): TITLES(S):

01.0 IDENTIFY SAFE WORKING CONDITIONS AT THE LABORATORY AND WORKPLACE, AND OBSERVE SAFETY PRECAUTIONS - The student will be able to:

- 01.01 Clean work area and maintain it in a safe condition.
- 01.02 Apply lab policies and procedures for safety, including fire safety.
- 01.03 Identify and operate workplace-safety electrical devices.
- 01.04 Identify health-related problems that may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 01.05 Demonstrate procedures for disaster situations.
- 01.06 Demonstrate the proper use and care of hand and power tools and equipment.
- 01.07 Demonstrate knowledge of CPR (cardiopulmonary resuscitation) and first aid.
- 01.08 Troubleshoot residential electric circuits.
- 01.09 Drill holes in metal, wood, and concrete for electrical wiring.
- 01.10 Identify and select tools, equipment, materials, and wires to complete a job.
- 01.11 Lay out electrical devices, complying with the appropriate local, state, or national electric codes:
 - a. Conductors and cables
 - b. Standard outlets and switch boxes
 - c. Explain cord connections on major appliances
 - d. Cords, switches, receptacles, and dimmers, including a single-pole switched lighting circuit, a three-way switched lighting circuit, and a four-way combination circuit

02.0 DEMONSTRATE AN UNDERSTANDING OF BASIC DIRECT-CURRENT (DC) ELECTRICAL-CIRCUIT SKILLS -- The student will be able to:

- 02.01 Define the terms "voltage," "current," "resistance," "power," and "energy."
- 02.02 Measure voltage, amperage, and resistance, using a volt-ohm meter (VOM) and a digital volt-ohm meter (DVM).
- 02.03 Analyze and explain a series, series-parallel, and parallel circuit.
- 02.04 Draw each type of circuit and calculate the circuit values.
- 02.05 Explain and apply Ohm's Law.
- 02.06 Compute conductance and resistance of conductors and insulators.
- 02.07 Read and interpret color codes to identify resistors.
- 02.08 Explain voltage dividers (loaded and unloaded).

03.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS -- The student will be able to:

- 03.01 Ask and answer questions coherently and concisely.
- 03.02 Read and follow written instructions and listen to and follow oral instructions.
- 03.03 Give reports orally and in writing.

LIST PERFORMANCE STANDARD ADDRESSED: (Continued)

NUMBER(S): TITLES(S):

- 03.04 Read critically in order to recognize assumptions and implications and to evaluate ideas.
- 03.05 Find job-related information in technical literature such as a manufacturer's manual.
- 03.06 Read and interpret the graphs, charts, diagrams and tables.
- 03.07 Communicate job-related information with other trades.

04.0 APPLY ELECTRICITY-RELATED BASIC MATH - The student will be able to:

- 04.01 Solve basic math problems related to electrical work.
- 04.02 Convert units of measurements between the English system and the metric system.
- 04.03 Use scientific notation.
- 04.04 Demonstrate proficiency with a calculator.

05.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICITY - The student will be able to:

- 05.01 Explain the principles of electromagnetism.
- 05.02 Explain the magnetic properties of circuits and devices.
- 05.03 Relate electricity to the nature of matter.
- 05.04 Describe various ways that electricity is produced.

09.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS - The student will be able to:

- 09.01 Exercise self-control.
- 09.02 Identify and demonstrate appropriate responses to criticism.
- 09.03 Recognize basic human-relations skills as they relate to success in the electrical industry.
- 09.04 Resolve customer complaints in a positive, professional manner.
- 09.05 Demonstrate respect for customer property by cleaning the work area after duties are completed.

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LIST PERFORMANCE STANDARD ADDRESSED:

NUMBER(S): TITLES(S):

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICES --The student will be able to:

- 01.01 Apply laboratory policies and procedures.
- 01.02 Apply laboratory safety rules and procedures.
- 01.03 Demonstrate the operation of laboratory safety devices.
- 01.04 Demonstrate personal safety procedures.
- 01.05 Demonstrate first aid and emergency treatment procedures.
- 01.06 Apply fire safety rules and procedures.
- 01.07 Apply electrical safety rules and procedures.
- 01.08 Demonstrate procedures for a disaster situations.
- 01.14 Solder and de-solder components.
- 01.15 Drill holes in metal or plastic chassis.
- 01.16 Measure voltage in a simple circuit.
- 01.17 Measure amperage in a simple circuit.
- 01.18 Measure resistance in a simple circuit.
- 01.19 Produce voltage by chemical means.
- 01.20 Produce voltage by mechanical means.
- 01.21 Produce voltage by thermal means.
- 01.22 Produce voltage by photoelectric means.

02.0 DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) CIRCUITS -- The student will be able to:

- 02.01 Solve basic algebraic problems as applicable to electricity and electronics (prerequisite to DC).
- 02.02 Relate electricity to the nature of matter.
- 02.03 Identify sources of electricity.
- 02.04 Define voltage, current, resistance, power and energy.
- 02.05 Apply and relate Ohm's Law.
- 02.06 Measure properties of a circuit using volt-ohm meters (VOM) and digital volt-ohm meters (DVM) meters.
- 02.07 Compute and measure conductance and resistance of conductors and insulators.
- 02.08 Analyze series circuits.
- 02.09 Construct series circuits.
- 02.10 Troubleshoot series circuits.
- 02.11 Draw a series circuit and calculate circuit values.
- 02.12 Analyze parallel circuits.
- 02.13 Construct parallel circuits.
- 02.14 Troubleshoot parallel circuits.
- 02.15 Draw a parallel circuit and calculate circuit values.

LIST PERFORMANCE STANDARD ADDRESSED: (Continued)

NUMBER(S): TITLES(S):

- 02.16 Analyze series-parallel circuits.
- 02.17 Construct series-parallel circuits.
- 02.18 Troubleshoot series-parallel circuits.
- 02.19 Draw a series-parallel circuit and calculate circuit values.
- 02.20 Define magnetic properties of circuits and devices.
- 02.21 Determine physical and electrical characteristics of capacitors and inductors.
- 02.22 Setup and operate a VOM for DC circuits.
- 02.23 Setup and operate a DVM for DC circuits.
- 02.24 Setup and operate power supplies for DC circuits.
- 02.25 Setup and operate power supplies for DC circuits.
- 02.26 Construct a simple DC generator.
- 02.27 Construct a simple DC motor.
- 02.28 Analyze and measure inductive-reactance (R-L) and reactive-capacitance (R-C) time constants.
- 02.29 Setup and operate oscilloscopes for DC circuits.
- 02.30 Analyze filter circuits.
- 02.31 Construct filter circuits.
- 02.32 Troubleshoot filter circuits.
- 02.33 Setup and operate frequency counters for DC circuits.
- 02.34 Setup and operate signal generators for DC circuits.
- 02.35 Setup and operate capacitor and inductor analyzers for DC circuits.



NOTE: Use either the Tab key or mouse click to move from field to field. The box will expand to accommodate your entry.

<i>Section 1</i>	
COURSE PREFIX AND NUMBER: <u>BCT 1609</u>	SEMESTER CREDIT HOURS: <u>3</u>
COURSE TITLE: <u>DC Theory</u>	

Section 2

TYPE OF COURSE: (Click on the box to check all that apply)

<input type="checkbox"/> AA Elective	<input type="checkbox"/> AS Required Professional Course	<input type="checkbox"/> College Prep
<input type="checkbox"/> AS Professional Elective	<input checked="" type="checkbox"/> AAS Required Professional Course	<input checked="" type="checkbox"/> Technical Certificate
<input type="checkbox"/> Other _____		
<input type="checkbox"/> General Education: (For General Education courses, you must also complete Section 3 and Section 7)		

Section 3 (If applicable)

INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:

<input type="checkbox"/> Communication	<input type="checkbox"/> Social & Behavioral Sciences	<input type="checkbox"/> Mathematics
<input type="checkbox"/> Natural Sciences	<input type="checkbox"/> Humanities	

Section 4

INTELLECTUAL COMPETENCIES:

<input checked="" type="checkbox"/> Reading	<input type="checkbox"/> Speaking	<input type="checkbox"/> Critical Analysis	<input type="checkbox"/> Quantitative Skills	<input type="checkbox"/> Scientific Method of Inquiry
<input checked="" type="checkbox"/> Writing	<input checked="" type="checkbox"/> Listening	<input type="checkbox"/> Information Literacy	<input type="checkbox"/> Ethical Judgment	<input checked="" type="checkbox"/> Working Collaboratively

<i>Section 5</i>	
LEARNING OUTCOMES	METHOD OF ASSESSMENT
• Demonstrate an understanding of basic direct-current (DC) electrical-circuit skills	NCCER Module Certification Score 70% or better
• Communicate effectively.	NCCER Module Certification Score 70% or better
• Apply electricity-related basic math.	NCCER Module Certification Score 70% or better
• Demonstrate an understanding of basic electricity.	NCCER Module Certification Score 70% or better
• Read and interpret basic electric codes.	NCCER Module Certification Score 70% or better
• Demonstrate proficiency in electrical math problems.	NCCER Module Certification Score 70% or better
• Demonstrate specialized electrical skills.	NCCER Module Certification Score 70% or better
• Demonstrate an understanding of entrepreneurship.	NCCER Module Certification Score 70% or better
• Demonstrate employability skills.	NCCER Module Certification Score 70% or better
• Identify safe working conditions and observe safety precautions.	NCCER Module Certification Score 70% or better

Section 6 Name of Person Completing This Form: Jim Yurko