COURSE: EEM 105  
PREFIX NO.: 105  
EFFECTIVE DATE: Spring 2006  
NEXT REVIEW DATE: Spring 2008

TITLE: Basic Electricity  
CREDITS: 2  
CONTACTS: CLASS 1  LAB 3  TOTAL 2

PREREQUISITES: None

DESCRIPTION:  
**Level I:** This course is a survey of basic electrical principles, circuits, and measurements.

**Level II:** A study of basic electricity and its applied fundamentals presented in a simplified manner to serve as an introduction for electrical and electronic students. Course content will include sources of electricity, conductors and insulators, resistors and capacitors, Ohm's law, series circuits, parallel circuits, meters, series-Parallel circuits, AC voltage, electromagnetic induction, motors, reactance and impedance, LCR circuits and filters.

TEXTBOOK(S) OR ALTERNATIVE: Electricity and Basic Electronics, Stephen R. Matt, Goodheart-Wilcox, Copyright 1982.

MATERIALS (specifying those to be purchased by student): Class Handouts

COLLATERAL READING: As Assigned

CLASS MANAGEMENT ACTIVITIES (Attendance, tardies, testing, etc.):  
Academic Dishonesty: Students are expected to do their own work. Please refer to the NETC Student Code and Grievance Procedure for definition of academic dishonesty and an outline of disciplinary action that may result there from.

Attendance: Students are expected to attend all scheduled classes, however, up to 10 hours of absence are allowed for unavoidable hardships such as illness or car trouble. A student missing more than 10 hours of class for any reason will be dropped from the course for excessive absences. A grade of "W" will be assigned if a student drops, or is dropped from a class prior to mid-term. After mid-term, a grade of "WF" is assigned unless there are extenuating circumstances and the student is passing the course at the time of withdrawal.

Tardies: A student is considered tardy if he or she arrives for class after the roll has been taken. Three tardies constitute 1 hour of absence.

Assigned Work: If a student is absent the day an assignment (test and/or homework) is due, he is required to complete the work on the first day back in class.
Disabilities Statement: Students with disabilities are encouraged to contact the Vice President for Student Services to discuss needs or concerns as they pursue an academic program and participate in campus life. The Vice President for Student Services will provide guidance regarding official documentation of disabilities and/or accommodation of needs. (See College Catalog)

Student ID: It is mandatory that every student wear his or her student ID at all times when on the Cheraw campus. During the first week of classes, the instructor will issue a reminder to wear the ID. This reminder is a warning.

After the first week, instructors are required to dismiss students without ID from class. The student may get his/her ID (or a new one in Student Services for $3.00) and return to class before the midpoint of the class. If the student cannot get an ID and return to class by the midpoint, the instructor will record the absence.

RESOURCES (A-V, persons, tools/equipment):

COURSE TOPICAL OUTLINE (List topics and sub-topics of course) and Calendar or approximate length of time devoted to topic.

LESSON ONE - LEARNING AND APPLYING THE FUNDAMENTAL
A. Use of electricity
B. Safety
C. Learning opportunity
D. Basic concept of a circuit
E. Electrons
F. Batteries
G. Symbols
H. Probes
I. Project tester and fuse saver
J. Test of knowledge

LESSON TWO - SOURCE OF ELECTRICITY
A. Chemical energy
B. Light energy
C. Pressure
D. Heat
E. Magnetism
F. Magnetic declination
G. Demonstration of magnetism
H. Test of knowledge

LESSON THREE - CONDUCTORS AND INSULATORS
A. Wire (solid vs. standard)
B. Wire covering
C. Insulated wire
D. Wire stripping
E. Wire size
F. Resistance wire
G. Measurement of round wire (circular mils)
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H. Fuses and circuit breakers (types and operation)
I. Insulators
J. Proper soldering (steps-types of solder, heat sinks and poor solder joints)
K. Wire protection
L. Electrical codes (guide lines)
M. Test of Knowledge

LESSON FOUR - RESISTORS AND CAPACITORS
A. Resistors (types, symbols, values and color code)
B. Thermistors
C. Capacitors (action, construction, types, symbols, factors affecting capacitance, terms, substituting and soldering)
D. Test of Knowledge

LESSON FIVE - OHM'S LAW
A. Variables of Ohm's Law (voltage, current and resistance)
B. Circuit voltage
C. Circuit amperage
D. Wattage - kilowatt hours
E. Milli and microamps
F. Resistance (body, resistance vs. pressure)
G. Current path
H. Test of knowledge

LESSON SIX - SERIES CIRCUITS
A. Electron path
B. Amps in a series circuit
C. Total resistance
D. Polarity
E. Voltage - voltage drop
F. Ohm's Law in series circuits

LESSON SEVEN - PARALLEL CIRCUITS
A. Current in a parallel circuit
B. Resistance in a parallel circuit
C. Total resistance and current
D. Uses for parallel circuits
E. Schematic drawings
F. Parallel power sources
G. Resistors in parallel
H. Voltage in parallel
I. Test of knowledge

LESSON EIGHT - METERS
A. Types (pointer - digital)
B. Ammeter
C. Galvanometer
D. Range selector
E. D'arsonval movement
F. Multimeter readings (current-voltage resistance)
G. Vacuum tube voltmeter
H. Test of knowledge
LESSON NINE - SERIES PARALLEL
A. Location of resistances
B. Circuit layout
C. Order for solving total resistance
D. Power supplies in series

LESSON NINE - SERIES PARALLEL (continued)
E. Current flow
F. Capacitors in parallel (symbols)
G. Capacitors in series
H. Distance between plates
I. Series - parallel capacitors
J. Capacitors - resistor combinations
K. Grounds
L. One wire systems
M. Polarity
N. Points of reference
O. Voltage dividers
P. Wheatstone bridge (voltage drop)
Q. Test of knowledge

LESSON TEN - AC VOLTAGE
A. Producing alternating current (AC)
B. Sine wave (points)
C. Sine wave factors
D. Frequency
E. Period
F. Amplitude
G. Peak voltage
H. Heat factor
I. RMS value (root mean square)
J. Square wave
K. Application of sine waves
L. Signal generators
M. Phase relationships
N. Test of knowledge

LESSON ELEVEN - ELECTROMAGNETIC INDUCTION
A. Induced voltage
B. Induced EMF (electromotive force)
C. Inductance
D. Magnetic coupling
E. Inductor symbols and uses
F. Unit of measure (Henry)
G. Inductors in DC circuits
H. What affects inductance
I. Inductors in series
J. Inductors/resistor combination
K. Mutual inductance
L. Transformers (winding-cores)
M. Transformer (step-up/step-down)
N. Voltage-current relationship
O. Power
LESSON TWELVE - MOTORS
A. Motors and generators
B. Symbols
C. Parts and make-up
D. Classification (motors-generators)
E. Selection
F. Direct current motors
G. Voltage checks
H. Induction motor (operation)
I. Synchronous motors
J. Generators
K. Direct current output
L. Eddy currents
M. AC generator/alternator
N. Three phase alternators
O. Test of knowledge

OBJECTIVES OF COURSE: To provide electrical and electronic students a thorough comprehension of applied basic electricity. Upon successful completion of this course the student will have demonstrated a skill and knowledge in the areas below.

1. Sources of Electricity
2. Conductors and insulators
3. Resistors and capacitors
4. Ohm's Law
5. Series circuits
6. Parallel circuits
7. Meters
8. Series-parallel circuits
9. AC voltage
10. Electromagnetic induction
11. Motors
12. LCR circuits
13. Filters

INSTRUCTIONAL METHODS TO COMPLETE OBJECTIVES: Textbook, lecture, demonstration, and lab practice.

EVALUATIVE METHODS TO APPRAISE OBJECTIVES: Student progress and evaluation will be measured by written objective test following each motor topic, a final exam and by instructor’s evaluation of student’s participation.

GRADING SCALE: 94 - 100 = A
88 - 93 = B
82 - 87 = C
76 - 81 = D
Below 75 = F