EET 130

FUNDAMENTALS OF ELECTRICITY

COURSE DESCRIPTION

Introduction to DC and AC circuits, electromagnetic devices, electronic components and analog and digital circuits for non-electronics majors.

Text(s): Pearson Custom Coursepack ISBN: 1256073725

Prerequisites: Completion of all remedial courses

Co-requisites: 

Credits: 3 Lecture Hours: 2 Studio/Lab Hours: 2

Coordinator: Professor DeFino, P.E. Latest Review: Fall 2017

Office: ET130 609-570-3456 definod@mccc.edu

Office Hours: TBD
Mercer County Community College is in compliance with both the ADA and section 504 of the Rehabilitation Act. If you have, or believe you have, a differing ability that is protected under the law please see Arlene Stinson in LB216 { 570-3525  stinsona@mccc.edu} for information regarding support services.

**Attendance Policy:**
Mercer County Community College does not have a “cut system.” Students are expected to attend all classes of every course on their schedules. Only illness or serious personal matters may be considered adequate reasons for absence.

It is the prerogative of the instructor to excuse absences for valid reasons, provided the student will be able to fulfill all course requirements. 

**IF YOU MISS A CLASS IT IS YOUR RESPONSIBILITY TO GET NOTES FROM SOMEONE IN THE CLASS**
Student performance in classes is formally verified at the middle of each full semester. If a student’s attendance has been infrequent or performance unsatisfactory, he or she may receive notification in the mail. At any time, the instructor may withdraw the student from class for insufficient attendance.

**Academic Integrity:**
Students are required to perform all the work specified by the faculty and are responsible for the content and integrity of all academic work submitted, such as papers, reports, and examinations. A student will be guilty of violating the Rule of Academic Integrity if he or she:

- Knowingly represents the work of others as his or her own;
- Uses or obtains unauthorized assistance in any academic work;
- Gives fraudulent assistance to another student.
- Intentionally damages any contents of the lab or classroom
- Is found to have stolen anything from the lab or classroom

**Penalty:**
First Violation for stealing or damaging is F in the course.
First violation on test or project is an “F” grade for the test or project.
Second violation is “F” in the course.

**Temporary Grade Policy:**
If you do not complete the course requirements by the end of the semester, and you have a prior agreement with the instructor, you may be given an “I” (incomplete). “I” indicates that the instructor is affording extra time to earn a grade in the course. The amount of extra time is determined by the instructor, up to a maximum of 16 calendar weeks after grades are submitted. An “I” grade which has not been resolved within 16 calendar weeks is changed to an F or NC (no credit) grade, as appropriate to the course.
**Letter Grades:**

Letter grades and quality points are shown in the chart under grading.

**Audit:**

If you audit the course, you will receive an “AU” grade—this cannot be changed to a letter grade.

**Withdrawal Course Requirements:  Deadline: See Campus Calendar**

To receive a W grade for any course, a student must consult with the course instructor or an appropriate division representative and then withdraw officially before two-thirds of the course has been completed by submitting a withdrawal form to the Office of Student Records. Withdrawal after this point results in a grade other than W (usually F). At any time before two-thirds of the course has been completed, the instructor may also withdraw with a W grade any student who has been absent excessively. A student thus withdrawn will not be entitled to any refund of tuition or fees. The student may appeal this action.

**General Education Knowledge Goals [GEKG]**

**Goal 1. Communication.** Students will communicate effectively in both speech and writing.

**Goal 2. Mathematics.** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

**Goal 3. Science.** Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

**Goal 4. Technology.** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

**MCCC Core Skills [CS]**

**Goal A. Written and Oral Communication in English.** Students will communicate effectively in speech and writing, and demonstrate proficiency in reading.

**Goal B. Critical Thinking and Problem-solving.** Students will use critical thinking and problem solving skills in analyzing information.

**Goal D. Information Literacy.** Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

**Goal E. Computer Literacy.** Students will use computers to access, analyze or present information, solve problems, and communicate with others.

**Goal F. Collaboration and Cooperation.** Students will develop the interpersonal skills required for effective performance in group situations.
GENERAL OBJECTIVES

Student will be able to demonstrate:
1. An understanding of the history of electricity.
2. An understanding of basic electricity (AC & DC)
3. An understanding of certain electrical components
4. An understanding of analog versus digital meters

UNIT OBJECTIVES

Unit 1

Students will be able to:

1. Describe the following terms: open circuit, closed circuit, voltage, current, power, ampere, ohm, conductor, insulator.
2. Convert basic electrical units into their sub or multiple unit equivalents.
3. Determine the acceptable resistance range for a given resistor color code.
4. Calculate the resistance of given length of AWG wire.
5. Calculate the energy usage and cost for one month for a given set of appliances.
6. Calculate the thickness required for a given insulator and voltage requirement.
7. Use Ohms law to find voltage, current or resistance given any two.
8. Calculate the power in a resistor.

Unit 2

Student will be able to:

1. Show an example of a series circuit and parallel circuit.
2. Calculate the current, voltages and power in a series circuit.
3. Calculate the currents and power in a parallel circuit.
4. Calculate the total resistance for a series or parallel circuit.
5. Use Ohm’s law and the power formula to calculate the currents, voltages and powers, given sufficient information, for a series or parallel circuit.
6. Calculate the total voltage for two or more batteries in series.
7. Calculate the total current available from a set of batteries in parallel.
8. Read current and voltage from either an analog or digital meter.
9. Calculate percent error between two values.
10. Calculate the resistance values for a given potentiometer setting.
11. Identify circuit “ground”
Unit 3

Student will be able to:

1. Distinguish between AC and DC
2. Identify a sine wave, square wave, or triangle wave.
3. Calculate the period and frequency of an AC wave.
4. Calculate $V_{pk}$, $V_{pp}$, $V_{rms}$ or $V_{eff}$ given sufficient information.
5. Calculate the instantaneous voltage for a sine wave given sufficient information.
6. Calculate the time constant for an RC or RL circuit.
7. Calculate the charging time for an RC or RL circuit.
8. Calculate the voltage and current for an RC or RL circuit at any time given sufficient information.
9. Describe the basic construction of a capacitor and inductor
10. Calculate the mmf for a given set of conditions.
11. Calculate the secondary voltage for a given transformer
12. State the basic rules and relationships related to a capacitor or inductor.

Unit 4

Student will be able to:

1. Distinguish between $R$, $X_c$ and $X_l$
2. Calculate $X_c$ and $X_l$ given sufficient information.
3. Calculate from a scope trace the voltage and frequency of a sine wave.
4. Calculate the total capacitance for two capacitors in series or parallel.
5. Calculate the total inductance for two inductors in series or parallel.

METHOD OF INSTRUCTION

Learning will take place via classroom instruction, demonstrations, and student activities, as well as through textbook reading and homework assignments. Lab activities will augment this.

Use of equipment and manual skills will be developed in the lab.

GRADING
The final grade will be based on four test grades, weekly quizzes, and the lab grade.

The lab grade will be based on performance in each lab. The assessment will be based on the lab sheets for each experience.

Since all tests will be cumulative and may also include problems related to the labs, there will not be a final exam.

<table>
<thead>
<tr>
<th>Letter grade</th>
<th>Nominal %</th>
<th>Definition</th>
<th>QPA quality points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
<td>Superior achievement</td>
<td>4.0</td>
</tr>
<tr>
<td>A-</td>
<td>90-92</td>
<td></td>
<td>3.7</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
<td></td>
<td>3.4</td>
</tr>
<tr>
<td>B</td>
<td>83-86</td>
<td>Above average achievement</td>
<td>3.0</td>
</tr>
<tr>
<td>B-</td>
<td>80-82</td>
<td></td>
<td>2.7</td>
</tr>
<tr>
<td>C+</td>
<td>77-79</td>
<td></td>
<td>2.4</td>
</tr>
<tr>
<td>C</td>
<td>70-76</td>
<td>Average achievement</td>
<td>2.0</td>
</tr>
<tr>
<td>D</td>
<td>60-69</td>
<td>Minimally passing</td>
<td>1.0</td>
</tr>
<tr>
<td>F</td>
<td>0-59</td>
<td>Academic failure</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Evaluation Tools**

<table>
<thead>
<tr>
<th>Percentage Of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Unit Tests</td>
</tr>
<tr>
<td>1 Report</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>