**Course Description:** (Co-requisite EE 352) Introduction to electrical instrumentation, measurement of the voltage and the current and transient response of RLC circuits, design and testing of RLC circuits, measurement of frequency response of networks, design and testing of filter circuits.

**Lecturer:** Dr. Nizar Al-Holou, Professor

**Office and Phone:** Room E330, 993-3365

**Office hours:** As posted. Other hours are by appointment.

**Course objective:** To provide the student the connection between the theory and application, and learn the process of analysis, measurement and design of electric circuits through the experiments in the laboratory.

**Course Outcomes:** A student who passed this course should be able to do the following tasks:
1. Use the digital- multi meter to measure voltage, current, resistance of the DC circuit to verify the fundamental techniques used for the circuit analysis
2. Design a simple voltage divider and a current divider.
3. Use the oscilloscope, function/signal generator to measure sine and pulse measurements.
5. Analyze and measure the frequency response of series RLC circuits.
6. Design DC and AC circuits.
7. Simulate an electric circuit

**Text Books:**
2. Laboratory Notebook available from Dr. Mohan. Please note that these lab notebooks will be used for all the lab courses, and have to be handed in and will be the property of ECE Dept. at the end of EE403.

**Reference text:** Schematic Capture with PSpice, Herniter Merrill.
EE352 Text Book.

**Prerequisite:** Fundamental Circuit Analysis

**Co-requisite:** EE352 - Network Theory II

**Web Resources:** This course has a web site at: [http://knowledge.udmercy.edu](http://knowledge.udmercy.edu)
Important announcements and other resources will be available on the web site. It should be consulted frequently, since updates are made regularly. Note in particular that the site has an
electronic discussion feature that allows you to ask and answer questions about the course.

**Computer usage:**

Some of the assigned laboratory experiments will require use of the PSpice software package for circuit simulation.

**Course outline:**

Over twenty five laboratory experiments and two design projects will be assigned during the course of the term. Students will be required to synthesize circuits that achieve the performance goals laid down for the circuit. In all cases the circuit design must evolve as a result of the strict application of good design methodology.

1. Resistor color code and measurement of resistance Exp#2
   Switches and Switching Circuits Exp#5.
   Ohm’s Law Exp#7.
   Design Series Circuit Exp#9.
   Voltage-Divider Circuits (unloaded) Exp#10.
   Signal-Generator Operation Exp#32.
   Oscilloscope Voltage and Frequency Measurement Exp#33.
5. OP-Amp Characteristics Exp#38
   Linear OP-Amp Circuits Exp#39
   Nonlinear Op-Amp Circuits Exp#40
   Source: Buchla 6th Ed
6. Design project #1: DC Circuit Design.
7. Sinusoidal Voltages, Currents and Power (handout)
8. Series and Parallel Resonant Circuits (handout)
9. Montecarlo Analysis (handout)
10. Design project #2: AC Circuit Design.

**Computer usage:**

The assigned laboratory projects will require extensive use of Pspice or *Electronics Workbench* for software simulation while exercising the design/analysis cycle.

**Tentative grading policy:**

The grade for the course will be based on several factors such as attendance and participation during the lab, completion of the design, technical quality and content of the design report, and performance in lab quizzes during the course of the term. The tentative distribution of grades will be as follows:

**(Tentative) Grading:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Prelab Reports, Logbook, Attendance &amp; Participation</td>
<td>20%</td>
</tr>
<tr>
<td>Report Quality and Content</td>
<td>20%</td>
</tr>
<tr>
<td>Design Projects</td>
<td>20%</td>
</tr>
</tbody>
</table>
Quizzes 40%

Withdraw Dates: February 4, 05 (without a “W”) and April 1, 05 (with a “W”).

Academic Integrity: Everything submitted for grading (tests, homework, projects etc) is expected to be a student’s own work. Anything suspected otherwise will be dealt with according to the College policy - see Engineering and Science Student Handbook.

Guidelines for Logbook Evaluation
Maintaining a logbook during the course is a requirement. The logbook must contain detailed descriptions of the historical record for all work undertaken during this course. This is the best way for you to back up your claims regarding achievement of all task goals in any review meeting with the instructor or teaching assistant.

Some of the good practices in maintaining a logbook are:
- all writing in black or blue ink
- legible writing
- up-to-date Table of Contents as well as clear and adequately descriptive section (page) headings for ease of information retrieval
- complete and thorough descriptions of work including evidence of “thinking in the notebook” in the process of formulating and implementing a concept.

More information on the purpose of logbooks in documenting engineering activity will be provided separately. Please consult with the instructor if you have any questions on logbook maintenance. Logbook grading will essentially be conducted on a 5-level scale corresponding to excellent, good, average, bad, and poor.

Additional Instructions Pertaining to Laboratory Etiquette
1. DO NOT attempt to adjust the heating/cooling of the laboratories. Dress appropriately, open windows partially if necessary, but remember to close them at the end of the lab.
2. DO NOT detach oscilloscope probe tips. If you need to use an oscilloscope to acquire a signal from a node in a breadboard, insert a jumper wire into the node and clip the probe around the wire.
3. After the lab is completed, carefully sort all components, have the teaching assistant review your sort for correctness, and once approved, put the parts away.
4. Turn off power to your lab station using the master switch behind each table.