Syllabus ECE 3330 Winter 2012

No: ECE3330

Title: Electrical Circuits 2

Credits: 4 Lecture

WSU Catalog Description: Continuation of sinusoidal steady-state concepts from ECE 3300. Three-phase systems. Complex frequency concepts. Frequency response and S-plane. Resonant and coupled circuits.

Instructor: Dr. Mark Ming-Cheng Cheng, Assistant Professor of Electrical and Computer Engineering

Office Hours: M 4:30-6pm Th 4-5:30pm or by appointments

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Course Meeting Time: T, Th 5:30pM to 7:20PM

Course Meeting Location: 0205 MANO

Goals: To develop competence in the analysis of electrical circuits and gain limited design experience with relatively simple electrical circuits.

Learning Objectives: At the end of this course, students will be able to:

1. For AC steady state conditions, explain and analyze the voltage / current relationships, impedance (resistance and reactance), and operational characteristics of resistors, inductors, capacitors, ideal switches, operational amplifiers, transformers, and voltage and current sources in terms of phasors.
2. For AC steady state conditions explain and analyze different electrical circuit morphologies. In particular; series and parallel circuit structures, equivalent circuit configurations arrived at by the combination of series and parallel circuit elements such as resistors, inductors, capacitors, current and voltage sources, equivalent circuit configurations arrived at using network theorems such as; Thevenin and Norton equivalent circuits, superposition, source transformations.
3. Explain and analyze power and energy dissipation and distribution for AC steady state circuits composed of the elements listed in the first objective. This will include complex power, RMS, reactive power, maximum power transfer, superposition, and 3-phase power systems with Y and Delta source and load configurations.
5. Perform an input/output analysis using network functions in both the phasor and complex frequency domain.
6. Analyze an electrical circuits performance in the frequency domain using Network functions and Bode Plots.

**Textbook:** Introduction to Electric Circuits, R. Dorf and J Svoboda, 8th Edition  
Chapters 10-17

**Reference Texts:** none

**Prerequisites by Topic:** ECE 3300, ECE 3310, MAT 2150 (Differential Equations & Matrix Algebra)

**Computer Resources:** There will be a series of problems assigned using Altium Designer, MathCad, and/or MatLab. These programs are available on the PCs in the College’s PC laboratory, Rooms 2351 and 2359, Engineering Building. The PC lab’s hours are posted in front of the lab.

**Laboratory Resources:** Not Applicable

**Laboratory Policy:** Not Applicable

**Distribution of Points:**

**Homework:** Homework problems will be assigned at each class session. The problems will be used as the basis for class discussion and will be illustrative of the concepts covered in the text and lectures. Students may be asked to present their results to the class. Students are encouraged to form study groups and work together on the homework problems. The assigned problems will not, in general, be sufficient for mastery of the course material. It is expected that students will do all exercise problems and work through all examples provided in the text. The library has a collection of other basic circuit books for your use.

**Quizzes:** There will be at least one quiz a week. There will be no collaboration allowed on the quizzes. This must be independent work. Each quiz will be worth between 10-20 points. The quizzes are close book and close note.

**Exams (400 points):** Two 100 point exams are scheduled. There will be a final worth 200 points.

**Special Assignments (100 points):** There will be a series of special assignments during the duration of the class (design problems). Each special will have a point value assigned (20 points each). Special assignments may be individual assignments where each student must work independently or team/group oriented where students will be graded as a team. The assignment instructions will specify individual or team format. The evaluation will focus on the design, performance and cost.

**Grading Scale:**
The course grade will be based on the cumulative point a score. A cumulative score percentage will be determined by dividing each student’s cumulative score by the maximum number of obtainable points. The resulting percentage score will be used to assign a grade.

A percentage score in the range: 100-94 ----------- A
A percentage score in the range: 93-90 -------- A-
A percentage score in the range: 89-86 -------- B+
A percentage score in the range: 85-82 -------- B
A percentage score in the range: 81-78 -------- B-
A percentage score in the range: 77-74 -------- C+
A percentage score in the range: 73-70-------- C
A percentage score in the range: 69-65 -------- C-
A percentage score in the range: 64-55 -------- D
A percentage score in the range: 55-0 -------- F

**Attendance:** You are expected to attend every class session in its entirety. Do not schedule other classes or commitments that conflict with any part of the time during which your lab section is scheduled. Attendance is recorded and will be used in determining your grade. For each unexcused absence, Five (5) points will be deducted from your final cumulative point score.

**Makeup Exam and Makeup Assignment Policy:** No makeup quizzes or exams. No late assignments.

**Outcome Coverage:**

1. An ability to identify, formulate and solve engineering problems. The course is primarily oriented toward electrical circuit analysis but also includes examples of where linear circuit theory can be applied to other physical domains to model system performance. Students must be able to identify the system, formulate a circuit model, and solve the circuit model to determine circuit variables, primarily with electrical circuits.

2. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. Students will use computer simulation and modeling software as well as computational and analysis software, i.e., Workbench, Mathcad and/or Matlab. Students will be required to use web based resources for component selection and additional reference materials.

3. An ability to apply complex variables in the analysis of linear circuits and systems. The students will be required to use complex number to describe circuit in frequency domain and s domain, and use mathematics to get solutions of transient response and AC steady state response.

**Cheating Policy and Penalty for Cheating:**
Cheating will not be tolerated. If students are caught cheating they will receive an E for the class. Students will neither provide nor receive assistance on quizzes or examinations. Special assignments will be designated either an individual or team assignment. As an individual assignment students must do the work independently.

Plagiarism is a form of cheating. According to WSU rules and regulations it is grounds for dismissal from school. Anyone caught cheating on assignments, quizzes or engaging in plagiarism will receive an E for this class and could be subject to further disciplinary action. It is assumed you understand what plagiarism means. If you do not then see the following definition and resources.

“Plagiarism is using others’ ideas and words without clearly acknowledging the source of that information.” From What is Plagiarism and how to recognize and avoid it. [http://www.Indiana.edu/~wts/plagiarism.html](http://www.Indiana.edu/~wts/plagiarism.html)
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