Catalog Description: EEC 311 Electric Circuits II (4-0-4). Fourier series and Fourier transform analysis; frequency response, resonance, and Bode plots; AC steady-state analysis and AC power; polyphase AC circuits; magnetically-coupled circuits; and two-port networks. Integration of computer applications based on PSpice and MATLAB.


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Course Objectives: This course is designed to help students to:
1. Understand the basic concepts of advanced electrical circuits involving linear elements such as resistors, capacitors, inductors, mutually coupled circuits (including various transformers).
2. Understand all forms of time varying sources, dependent sources, and polyphase systems.
3. Be able to solve these in the time domain as well as the frequency domain.
4. Understand how to solve these circuits using PSpice and MATLAB.

Expected Outcomes: Upon completion of this course, students should be able to:
1. Analyze advanced electrical circuits containing linear elements such as resistors, capacitors, inductors, mutually coupled circuits (including various transformers).
2. Analyze advanced circuits composed of all forms of time varying sources, dependent sources, and polyphase systems.
3. Analyze these circuits in the time domain as well as the frequency domain.
4. Successfully use MATLAB and PSpice to analyze these circuits.

Fulfills the Following Electrical Engineering Program Objectives and Outcomes:

Objectives: 1. Practice electrical engineering in one or more of the following areas: communications, computers, controls, power electronics, and power systems.
2. Define and diagnose problems, and provide and implement electrical engineering solutions in industry, business, and government.

**Outcomes:**

a) Knowledge of mathematics, science, and engineering  

b) Ability to design a system, component, or process  

c) Ability to use the techniques, skills, and modern engineering tool.

**Contribution of Course to Meeting the Professional Component:**

Math & Basic Science: 1 credit;  
Engineering Topics: 3 credits;  
General Education: 0 credits.

**Prerequisites or Corequisites by Topic:**

1. Understanding of basic circuit elements.  
2. Understanding of basic circuit analysis techniques.  
3. Laplace transforms and applying this to circuit analysis.  
4. Understanding of basic network theorems and how they can make analysis easier.  
5. Fundamental knowledge of electrostatic fields and electromagnetic fields.

**Topics:**

1. Application of Laplace transforms to circuit analysis 8  
2. Fourier Series. 6  
3. Fourier Transform. 4  
4. AC Circuit Analysis, sinusoids and phasors. 8  
5. AC Circuit Analysis, steady state. 6  
6. AC Power Analysis 6  
7. Three-Phase Circuits. 6  
8. Magnetically Coupled Circuits 8  
9. Two-Ports 8  

Total 60

**Computer Usage:** Students are expected to use PSpice and MATLAB in solving a variety of analysis problems.

**Prepared by:** Charles Alexander  

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