Circuits II

Topics covered:
• Fundamental analysis techniques for LTI circuits
  − Phasor Modeling
  − Laplace Transform
  − Fourier Series/Transform
• Components and circuits
  − Magnetically coupled circuits
  − Polyphase systems

Prerequisite topics: (ECE201)
• Circuit analysis
  − KVL, KCL, nodal/mesh analysis, superposition, ...
• Components and circuits
  − RLC circuits, op-amps
• Math (through Calc 2 & DE)
Contact Information

• **Instructor:** Daniel Costinett
  - Office: MK504
  - OH: T 2:30-4:00, W 3:30-5:00, by appointment
  - E-mail: Daniel.Costinett@utk.edu
  - Please use [ECE 202] in the subject line
  - Email questions will be answered within 24 hours (excluding weekends)

Textbook and Materials

**Textbook**
  - ISBN: 0073545511
  - required
- Course covers Chapters 10-17

**Course Website**
- [http://web.eecs.utk.edu/~dcostine/ECE202](http://web.eecs.utk.edu/~dcostine/ECE202)

**Software**
- MATLAB
- LTSpice
Course Website

ECE 692: Discrete Time Modeling of Power Electronics

Grade Schedule

Updated 10/22 December 03, 2019: Tentative lecture schedule, including links to lecture slides and notes, and links to assignments. The schedule is subject to change, please check frequently.

<table>
<thead>
<tr>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>Aug. 19</td>
<td>L1 - Aug. 21</td>
<td>L2 - Aug. 23</td>
</tr>
<tr>
<td>Course Introduction: Limitations of Averaged Modeling in Steady State</td>
<td>Homework 1 Due</td>
<td>Course Introduction: Steady-State Modeling with Parameters: Textbook: Sections 1.1-1.2</td>
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<tr>
<td>L3 - Aug. 26</td>
<td>L4 - Aug. 29</td>
<td>L5 - Aug. 30</td>
</tr>
<tr>
<td>Course Introduction: Limitations of Averaged in Dynamic Modelling Textbook: Section 1.3</td>
<td>Homework 1 Due</td>
<td>Review of State Space Modeling Textbook: Section 1.4</td>
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Grading

- **Homework: 20%**
  - Weekly, due on Fridays *before* the start of lecture
  - The one lowest homework grade will be dropped
- **Quizzes: 10%**
  - In-class, open-book, open-note & calculator
- **Labs: 15%**
  - Completed outside of class (by scheduling with TA)
- **Midterms: 30%**
- **Final: 25%**
  - All open-book, open-note & calculator
Assignments

• Submission
  – Homworks and Labs should be submitted by uploading a pdf to canvas
    ▪ Physical copy submitted prior to the due date/time loses 5% credit
    ▪ https://www.eecs.utk.edu/resources/it/eecs-it-knowledge-base/using-the-scanner/
    ▪ https://libanswers.utk.edu/faq/103187

Course Policy

• No late work will be accepted except in cases of documented medical emergency
• Collaboration encouraged on Labs and Homework
  – Must submit your own work on all assignments
  – Adhere to Student Code of Conduct
• Attendance is required in all lectures and scheduled lab time
How to Succeed in ECE202

• Attend all lectures
• Read associated sections in the book, as listed on the course schedule
• Work collaboratively to understand homework assignments
  – Complete your own work
  – Review any incorrect answers
• Actively participate in lab sessions
• Review material in advance of quizzes and tests
• Ask questions in lecture / office hours / e-mail after having made an attempt at the material on your own

INTRODUCTION TO ECE202
Example Application: Wireless Power Transfer

Commercial

Research

End of ECE201
Wireless Power Transfer (WPT)
Wireless Power Transfer (WPT)
Wireless Power Transfer (WPT)
WPT System Design
Receiver Side

A Slightly More Complicated System
A Slightly More Complicated System

Design-Oriented Analysis

Robert D Middlebrook
PhD, Stanford, 1955
CalTech Professor, 1955-1998

Course Content

• Magnetically Coupled Circuits (Ch 13)
• Sinusoidal Steady-State Analysis (Ch 10)
• AC Circuit Power Analysis (Ch 11)
• Circuit Analysis in the s-Domain (Ch 14)
• Frequency Response (Ch 15)
• Two-Port Networks (Ch 16)
• Fourier Circuit Analysis (Ch 17)
• Polyphase Circuits (Ch 12)