EE 442/642 COURSE SYLLABUS
Fall 2012

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Office Hours: T & Th: 1:00-2:30 and 4:00-5:30, and W: 11:00-12:00


References:

Course Content:

- Overview of electric and magnetic circuit concepts, power semiconductor switches, and computer simulation tools (Chapters 1-4).
- AC-DC conversion (diode rectifier, inductive filtering, controlled rectifier, effect of line inductance), (Chapters 5-6)
- DC-DC conversion (step-up, step-down, buck-boost, full-bridge) (Chapter 7)
- DC-AC conversion (pulse-width-modulation, and other switching schemes). (Chapter 8)
- Resonance converters (soft-switching techniques – ZCS and ZVS actions). (Chapter 9)
- DC power supplies (flyback, forward, and push-pull converters, switch control, protection and electrical isolation) (Chapter 10)
- Power conditioning and UPS (Chapter 11)
- Motor drive applications (speed control of DC motors, induction motors and synchronous motors) (Chapter 12-15).
- Residential, industrial, and utility applications (Chapters 16-17).
Course Objectives:

To teach students how to analyze and design

- AC-DC converter
- DC-DC converters,
- DC-AC converters,
- converters with minimum switching losses,
- DC power supplies,
- power conditioning circuits and un-interruptible power supplies,
- speed controllers for DC motors, induction motors and synchronous motors,
- power electronic circuits in residential, commercial, industrial and utility applications.

Course Outcomes:

Students should be able to:

- Characterize distorted and period waveforms and calculate real power content,
- Analyze and design AC-DC converters,
- Analyze and design DC-DC converters,
- Analyze and design DC-AC converters,
- Analyze and design resonant converters,
- Analyze and design DC power supplies,
- Analyze and design speed controllers for DC, induction, and synchronous motors
- Analyze and characterize power electronics circuits found in residential, industrial and utility applications.

Computer Usage:

PSpice

Tests & Homework:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Test 1 AC-DC and DC-DC converters,</td>
<td>20 Points</td>
</tr>
<tr>
<td>Test 2 DC-AC, resonant converters, DC power supplies</td>
<td>20 Points</td>
</tr>
<tr>
<td>Test 3 Applications (UPS, motor drives, utility applications)</td>
<td>20 Points</td>
</tr>
<tr>
<td>Final Covers all material</td>
<td>30 Points</td>
</tr>
<tr>
<td>Homework</td>
<td>30 Points</td>
</tr>
<tr>
<td>Total</td>
<td>120 Points</td>
</tr>
</tbody>
</table>
Grading:

\[ A \geq 100 \geq B \geq 80 \geq C \geq 60 \geq D \geq 40 > F \]

Notes:

- Late homework will not be accepted
- There will be no make-up tests.
- Class attendance and participation is highly encouraged.
- Graduate students will be assigned more homework problems, and more questions on the tests.

Academic Misconduct –

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Missed Class(es) / Student –

As a general rule, a student missing a class or laboratory assignment because of observance of a religious holiday shall have the opportunity to make up missed work. Students must notify the instructor of anticipated absences by the last day of late registration, January 28, 2008, to be assured of this opportunity. Faculty may give students an additional week, but are encouraged to set a clear deadline. NOTE: Students who represent UNLV at any official extracurricular activity shall also have the opportunity to make up assignments, but the student must provide official written notification to the instructor no less than one week prior to the missed class(es).

Rebelmail –
By policy, faculty and staff should only e-mail students’ Rebelmail accounts. Rebelmail is UNLV’s official e-mail system for students. It is one of the primary ways students receive official university communication. All UNLV students receive a Rebelmail account after admission to the university. Non-admitted students should contact the Student Help Desk at (702) 895-0761, in the Student Union Room 231, or by e-mail: studenthelp@unlv.edu. See http://rebelmail.unlv.edu/ for information.

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