

## EE344 Spring 2010 Syllabus

Date	Lec	Topic	Reading	Homework Assigned	Solution
<b>WEEK 1</b>					
T 1/12 (M Sched)	1,2	Motivation for Power Electronics vs Linear Electronics; Power Semiconductor Switches: Diodes and Thyristors; Heat Sinks			
W 1/13	3	Power Semiconductor Switches: BJT's, MOSFET's, GTO's, IGBT's			
R 1/14		<b>Lab 1: Multisim Switch Loss Exercise</b> <a href="#">Multisim Tutorial</a>			
F 1/15	3 (cont)	Power Semiconductor Switches: BJT's, MOSFET's, GTO's, IGBT's		<a href="#">PS1</a> DUE 1/22	<a href="#">Solution</a>
<b>WEEK 2</b>					
M 1/18		<b>MLK Holiday</b>			
W 1/20	4	AC-to-DC Conversion: half-wave rectifier with RL-load; input current distortion			
R 1/21		<b>Lab 2: Battery Charger Multisim Exercise</b>			
F 1/22	5	AC-to-DC Conversion: half-wave rectifier with RL-load and non-ideal diode model		<a href="#">PS2</a> DUE 1/29	<a href="#">Solution</a>
<b>WEEK 3</b>					
M 1/25	6	AC-to-DC Conversion: half-wave rectifier with RL + Voltage Source load ; Controlled half-wave rectifier, gating an SCR ON			
T 1/26		Add Course Deadline			
W 1/27	7	AC-to-DC Conversion: full-wave bridge rectifier with RL + Voltage Source load (continuous current operation)			
R 1/28		<b>Lab 3: Uncontrolled Half-Wave Rectifiers</b>			
F 1/29	8	AC-to-DC Conversion: full-wave bridge rectifier with RL + Voltage Source load (discontinuous current operation)			
<b>WEEK 4</b>					
M 2/1	9	AC-to-DC Conversion: full-wave bridge rectifier with LC filter and commutation delay			
W 2/3	10	AC-to-DC Conversion: full-wave bridge rectifier LC filter design			
R 2/4		<b>Lab 4: Uncontrolled Full-Wave Rectifiers</b>			
F 2/5	11	AC-to-DC Conversion: three-phase rectifier		<a href="#">PS3</a> DUE 2/12	<a href="#">Solution</a>
<b>WEEK 5</b>					
M-R		SNOW CANCEL			
F 2/12	12	AC-to-DC Conversion: three-phase rectifier with phase control			

WEEK 6					
M 2/15		<b>Washington's BDay Holiday</b>			
W 2/17	14	AC-to-DC Conversion: three-phase rectifier LC-output filtering; 12-pulse rectifiers			
R 2/18		<b>Lab 5: Three-Phase Controlled Bridge Rectifier</b>			
F 2/19		<b>Exam 1: Lectures 1-14</b>			
WEEK 7					
M 2/22	15	DC-to-DC Conversion: Buck chopper waveforms, Lcrit and Cmin determination		<a href="#">PS4</a> DUE 3/1	<a href="#">Solution</a>
W 2/24	16	DC-to-DC Conversion: Buck chopper effects of non-ideal components			
R 2/25	17	DC-to-DC Conversion: Buck chopper inductor design  <b>Lab 6: Simulink Modeling of a Buck Chopper</b>			
F 2/26	18	DC-to-DC Conversion: Buck chopper capacitor selection and high-side driver selection			
WEEK 8					
M 3/1	19	DC-to-DC Conversion: Buck chopper switch and diode selection			
W 3/3	20	DC-to-DC Conversion: Buck chopper design example		PS5 Handed out DUE 3/12	<a href="#">Solution</a>
R 3/4		<b>Lab 7: Closed-Loop Control of a Buck Chopper</b>			
F 3/5	21	DC-to-DC Conversion: Buck chopper state space averaging and closed-loop control			
WEEK 9					
M 3/8	22	DC-to-DC Conversion: Buck chopper input filtering			
W 3/10	23	Current-Mode Control			
R 3/11		<b>Lab 8: Buck Chopper Implementation</b>			
F 3/12 (early sched)	24	Power Converter Layout			
SPRING BREAK March 13-March 21					
WEEK 10					
M 3/22	25	DC-to-DC Conversion: Boost Converter waveforms, Lcrit and Cmin determination			
W 3/24	26	DC-to-DC Conversion: Boost Converter non-ideal components, low-side driver			
R 3/25		<b>Lab 9: Boost Converter Implementation</b>			
F 3/26	27	Isolated DC-to-DC Conversion: Flyback converter operation			
WEEK 11					
M 3/29		<b>EXAM #2: Lectures 15-26</b>			
W 3/31	28	Isolated DC-to-DC Conversion: Flyback converter Lcrit and Cmin determination			
R 4/1		<b>Lab 10: Flyback Converter Transformer</b>			

		<b>Design and Implementation</b>			
F 4/2	29	Isolated DC-to-DC Conversion: Full-Bridge converter waveforms and design relations			
<b>WEEK 12</b>					
M 4/5	30	High-Frequency transformer design			
T 4/6		12-Week Grades Due			
W 4/7	31	Snubber Design			
R 4/8		<b>Lab 11: Flyback Converter Implementation and Testing</b> MAPRs Due			
F 4/9	32	DC-to-AC Conversion: H-Bridge square-wave mode Drop Course Deadline			
<b>WEEK 13</b>					
M 4/12	33	DC-to-AC Conversion: H-Bridge square-wave mode example, sine-triangle pulse-width modulation			
W 4/14	34	DC-to-AC Conversion: H-Bridge STPWM inverter losses			
R 4/15		<b>Lab 12: H-Bridge Inverter Gating Signals</b>			
F 4/16	35	DC-to-AC Conversion: three-phase inverter, six-step mode			
<b>WEEK 14</b>					
M 4/19	36	DC-to-AC Conversion: three-phase inverter STPWM			
W 4/21	37	Three-phase induction motors			
R 4/22		<b>Lab 13: H-Bridge Inverter Implementation</b>			
F 4/23		<b>Exam 3: Lectures 27-36</b>			
<b>WEEK 15</b>					
M 4/26	38	Three-phase induction motor control			
W 4/28	39	Electric Vehicle Example			
R 4/29		<b>Lab 14: Electric Vehicle Simulink Simulation</b>			
F 4/30	40	Electric Vehicle Example continued			
<b>WEEK 16 +</b>					
M 5/3	41	<b>Review and Course Survey</b>			
T 5/4		<b>Spring Term Ends</b>			
W 5/5		<b>Review &amp; Study Day</b>			
R 5/6 – R 5/13		Final Exam TBD			
Sa 5/15		Grades due			
M 5/17		MAPRs due			
F 5/28		Graduation 2010			