

## ECE 320: Energy Systems I Fall 2003

**OBJECTIVE:** Single-phase AC measurements, transformer parameters, transformer performance, rotating DC machines, DC-DC PE converters.

**INSTRUCTOR:** Brian Johnson, Ph.D., P.E.  
Rm. 201 Gauss-Johnson Lab (GJL)  
Ph: 885-6902  
e-mail: bjohnson@ee.uidaho.edu

**CLASS TIME:** ECE 320: MWF 9:30am REN 129  
ECE 321 Lab: Tuesday or Thursday, GJL 102  
**The lab will not meet this week**

Other classes ECE 529: MWF 1:30pm-2:20pm

**OFFICE HOURS:** M,W,F 3:30pm- 4:30pm  
T,Th 11:30am-12:30pm  
or any time my door is open

**WEB PAGE** <http://www.ee.uidaho.edu/ee/power/ECE320/>

**TEXT BOOKS:** 1. J.W. Nilsson and S.A. Riedel, *Electric Circuits. 6th Edition.* Prentice-Hall, 2001. Or the text you used for Circuits II  
2. N. Mohan, T.M. Undeland, W.P. Robbins, *Power Electronics: Converters, Applications, and Design. 3rd Edition.* Wiley, 2003. The second edition is identical to the 3rd edition

**PREREQUISITES:** ECE212 or equivalent and Physics 212 or equivalent  
Co-requisite: ECE 321.

**GRADING:**

	%	Session	Date		
Exam #1	25	18	Approx. October 6	A	90-100%
Exam #2	25	34	Approx. November 12	B	80-90%
				C	70-80%
Homework	20			D	60-70%
Final Exam	30		Tues. Dec. 16, 10:00am	F	< 60%

- 1) Homework may include in-class presentations
- 2) Some assignments will require use of computers
- 3) Some exams may be take-homes

**APPROXIMATE CLASS OUTLINE**

TOPIC	CHAPTER	SESSION NUMBER
I. Review of Single Phase AC Circuits		
A. Circuit analysis, phasors	Nilsson Ch.9	1
B. Instanteous and average power	Nilsson Ch.10	2
C. Complex power, reactive power	Nilsson Ch.10	3-5
D. Power calculation methods	Nilsson Ch.10	6
E. Household wiring	Nilsson Ch.9	7
II. Magnetic Circuits and Transformers		
Ideal transformers	Nilsson Ch.9	8
Non-ideal Transformers	Nilsson Ch.9, Mohan Sec. 3.3	9-17
III. Exam 1		18
IV. DC Motors	Mohan Chap 13 and Notes	19-26
V. Fundamental Rules for Power Electronics	Mohan Notes	27-28
VI. DC-DC Power Converters		
A. Buck Converter	Mohan Sec. 7-3	29-31
B. Boost Converter	Mohan Sec. 7-4	32
C. Buck-Boost Converter	Mohan Sec. 7-5	33
VII. Exam 2		34
VIII. Single Phase Diode Rectifiers	Mohan Chap. 5	35-38
IX. Switched mode power supplies	Mohan Chap. 10	39-40
X. Per Unit Normalization	Notes	41-43
XI. Solving Larger Systems		44

Final Exam: Tuesday Dec. 16, 10:00 a.m.

**Note:** Exams may be given as ‘take homes.’

Date	Monday	Wednesday	Friday
Aug. 25	1	2	3
Sept. 1	H	4	5
8	6	7	8
15	9	10	11
22	12	13	14
29	15	16	17
Oct. 6	18	19	20
13	21	22	23
20	24	25	26
27	27	28	29
Nov. 3	30	31	32
10	33	34	35
17	36	37	38
24	H	H	H
Dec. 1	39	40	41
8	42	43	44

Final Exam: Tuesday December 16, 10:00am-12:00pm