Mastery Test Part 2 Preview

Review Session for
"Basic Electricity"
A Fairfield University E-Course
Powered by LearnLinc

Basic Electricity

Two Sections

- Electron Flow and Resistance
  - 5 on-line sessions
  - Lab
- Inductance and Capacitance
  - 5 on-line sessions
  - Lab

Mastery Test, Part 1

Basic Electricity (Continued)

- Text: "Electricity One-Seven," Harry Mileaf, Prentice-Hall, 1996, ISBN 0-13-889585-6 (Covers several Modules and more)
- References:
  - "Digital Mini Test: Principles of Electricity Lessons One and Two," SNET Home Study Coordinator, (203) 771-5400
  - Electronics Tutorial (Thanks to Alex Pounds)
  - Electronics Tutorial (Thanks to Mark Sokos)
  - Basic Math Tutorial (Thanks to George Mason University)
  - Vector Math Tutorial (Thanks to California Polytec at atom.physics.calpoly.edu)

Section 3:
AC, Inductors and Capacitors

- 0BJECTIVES: This section introduces AC voltage / current and their effects on circuit components (resistors, inductors, transformers and capacitors). The concept of impedance and the use of the vector analogy for computations is also introduced.

Section 3 Schedule:

Session 3a	– 05/13	Sine Waves, Magnitude, Phase and Vectors (again)	Text 4.1 – 4.24
3a continued	– 05/20	Complete 3a	
Session 3b	– 05/22	R-L Circuits (no class on 05/27)	Text 4.25 – 4.54
3b continued	– 05/29	Complete 3b	
Session 3c	– 06/03	R-C Circuits	Text 4.55 – 4.76
Session 3d	– 06/05	Series LC Circuits	Text 4.77 – 4.88
(lab - 06/08, Sat.)			
(lab - 06/10, Mon.)			
Session 3e	**– 06/12**	**Series RLC Circuits**	**Text 4.89 – 4.113**
(Quiz 3 due 06/16)			
Session 3f	– 06/17	Review (Discuss Quiz 3)	
3e continued	– 06/17	Series RLC Circuits	

Section 4: Impedance, Resonance and Filters

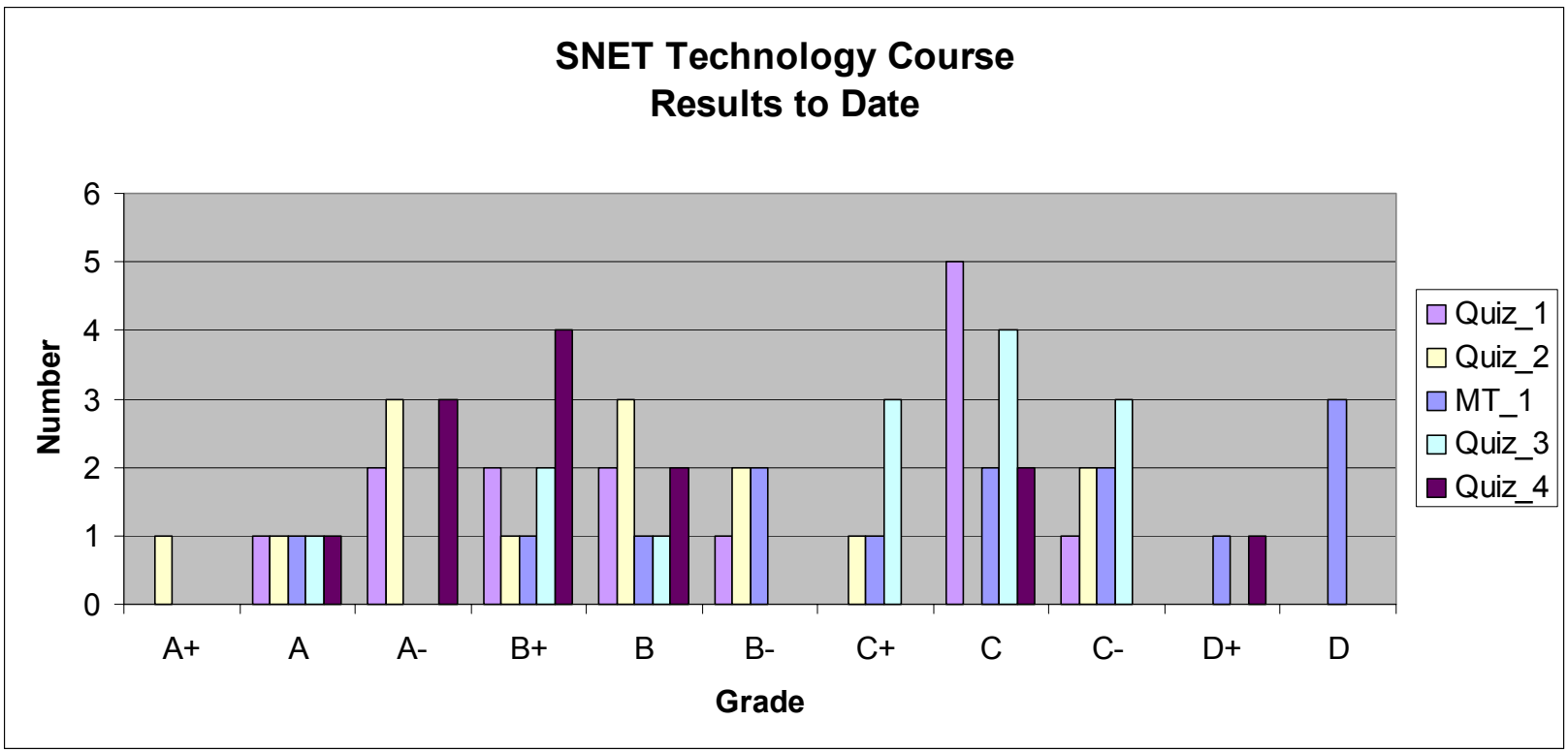
- 0BJECTIVES: This section discusses parallel RLC circuits and the concept of resonance (including resonant frequency, bandwidth and Q). The practical use of filters based on impedances and resonance is introduced. Using transformers and impedance matching is also introduced

Section 4 Schedule:

Session 4a	– 07/08	Parallel L-C Circuits	Text 4.114 – 4.122
Session 4b	– 07/10	Parallel R-L-C Circuits	Text 4.123 – 4.132
(break for a week)		(no class on 07/15 or 07/17)	
Session 4c	– 07/22	Parallel Resonance	Text 4.133 – 4.146
Session 4d	– 07/24	Tuning and Filters	Text 4.147 – 4.153
Session 4e	– 07/29	Resonant Transformers and Impedance Matching	Text 4.154 – 4.160
Oops, no class	– 08/5-7		
Session 4f	– 08/12	Section 4 Review	
(Quiz 4 due 08/17)			
	08/17	Section 4 Lab	
Session 4g	**– 08/19**	**Quiz 4 Review**	
	– 08/21	MT 2 Review	

Quiz Results

- Some of you need to correct some deficiencies. there's still time to improve before MT2. Put in an extra effort as we review for it.



Topics for Mastery Test

1. Schematic symbols (R, C, L, T, sources, switches and Ground)
2. Definitions
3. Formulas and how to use them
   a. Ohm's law
   b. Power and Power Factor
   c. Kirchoff's Laws (voltages around a loop, currents at a node)
   d. Inductive and Capacitive Impedances
4. Vector representation of Impedances
   a. Vector Components and adding Vectors
   b. Magnitude-Angle form
      1) Multiplying/dividing vectors
      2) Taking the inverse of a vector
      3) Taking the Square root of a vector

Topics (continued)

5. Parallel and serial combination of AC components
   a. Components are in parallel when they have both terminals in common (Impedances in parallel add as inverse vectors)
   b. Components are in series when the same current goes through both (Impedances in series add as vectors).
6. Resonance – when $|X_L| = |X_C|$
   a. Resonant frequency $fr = 1/2\pi(LC)^{½}$
   b. $Q = X_L/R$
   c. Bandwidth (passband) measured between ½ power (-3 dB) points in frequency response curve
7. Filters - Low Pass, High Pass and Band Pass
8. Transformers, Turns Ratio and Impedance Matching

Topics (continued)

9. Component specifications and their meanings
    a. Value: color codes
    b. Powers of ten:
    milli (-3), micro (-6), nano (-9), pico (-12),
    killo (3), mega (6) and giga (9)
    c. Tolerance
    d. Power rating (resistors)
    e. Voltage rating (capacitors, polarized)
    f. Current ratings (inductors, transformers, wire gauge and switch contacts)
10. Oscilloscope capability and use
11. Still no Thevenin, or Norton

Mastery Test 2

- Saturday after Labor Day, 7 September 2002
- Bannow Science Center
  - Classroom near Physics lab
- 9 to 11 am – be on time
- 50 multiple choice questions
- Makeup session - Monday, 10 September 2002
  - McAuliffee Hall 2nd floor at 6 pm sharp
    - Stone mansion on North Benson Road
    - Main university entrance, take first right and park
- Good luck

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(Quiz 4 due 08/17)			
	08/17	Section 4 Lab	
Session 4g	– 08/19	Quiz 4 Review	
	– 08/21	**MT 2 Review**	