

Basic Elec. Engr. Lab

ECS 210

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Office Hours:

BKD 3601-7

Tuesday 15:00-16:00

Friday 14:00-16:00

Announcement

- The Lab Manual for Lab 0 and Lab 1 is available at the **copy center**.
- Lab starts at 1:15 PM
- Read page 1-10.
 - We will talk about these pages today.

Course Organization

prapun.com/ecs210

- **Course Web Site:**

<http://www2.siit.tu.ac.th/prapun/ecs210>

- Lab manuals will be posted there.
 - You can download the manuals and print them out (even in color) if you don't want to buy it at the copy center.
 - For each week, make sure that you also have the lab manual for the subsequent week.
 - For example, today, we are working on Lab 0.
 - Before coming to the lab next week, make sure that you come well-prepared for lab 1 by reading the manual for Lab 1.

Course Organization (2)

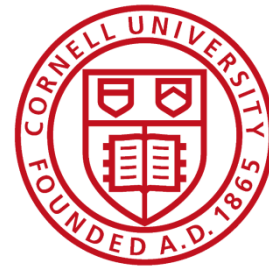
- The syllabus contains tentative information.
 - I will announce in class and on the web site if there is any change.
 - You are responsible for making sure that you obtain this information.
 - Come to lab on time and listen carefully for announcement.

Schedule

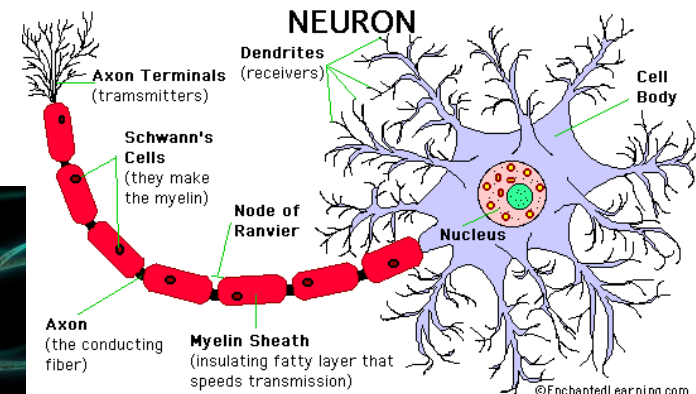
Date	Experiments
November 15, 2010	L0: Introduction
November 22, 2010	L1: DC Measurements
November 29, 2010	L2: Network Theorems I
December 6, 2010	No Lab
December 13, 2010	L3: Network Theorems II
December 20, 2010	E1: Midterm Exam
December 27, 2010	Mid-term Examination Period (No classes)
January 3, 2011	No Lab
January 10, 2011	L4: AC Measurement
January 17, 2011	L5: Resonance RLC Circuits
January 24, 2011	L6: Diodes and Rectifiers
January 31, 2011	L7: Operational Amplifiers
February 7, 2011	L8: Filters and Circuit Design
February 14, 2011	R: Practice Session
February 21, 2011	E2: Final Exam (Part A: In Lab)
March 11, 2011	E3: Final Exam (Part B)

Me?

prapun.com



- PhD from Cornell University
- In Electrical and Computer Engineering
- Minor: Mathematics (Probability Theory)
- Ph.D. Research: Neuro-Information Theory
 - Modeling and analyzing neurons in human brain from communication engineering perspective.
- Current Research: Wireless Communication
 - Mobile, WiFi
- Best Teaching Award, 2009, SIIT



Goal.

- Have fun in the lab.
- Obtain some appreciation for the theorems that you have studied
 - You will **verify many theorems**.
 - You will see that they actually work!
 - You will see that nature (at least in our controlled environment) can be described and analyzed by simple formulas.
- You will build **problem solving skill** and **debugging skill**.
- Increase eagerness to ask question IN ENGLISH.

Grading

Contents	Percentage
1. Quiz	10 %
2. Lab reports	30 %
3. In-lab participation/performance	10 %
4. Midterm examination	20 %
5. Final examination (Part A + B)	15 + 15 %
Total	100 %

Lab Report: 30%

- Submitted in group (**i.e., 1 copy per group**).
 - Submit at the beginning of the next lab
 - No report = no quiz.
 - Caution: If you are the one who keep the lab report with you, your lab partner cannot take the quiz until you arrive and submit the report.
- It **must be neatly PRINTED on a clean A4 paper**.
- Can download guideline/template from the class web site. (Will talk more about this next time.)
- Units are important.
- For student who copies *any part* of the report, a zero score will be given to *the whole* corresponding experiment.

Warning

Copying (even partially) = 0

Quiz: 15%

- To make sure that you come well-prepared for the lab, we will torture you with *at least* one quiz every week.
- Given at the beginning of the lab.
- There can be a couple more *pop quizzes*.
- For next lab, make sure that you know
 - how to read resistor color code
 - Explained in the appendix of the manual for Lab 0
 - Ohm's law, KVL, KCL, Voltage/current divider

Three Exams: 50%

- Practical exams 35% = 20% Midterm + 15% Final Part A
- Usual pen & paper exams 15%.
- Final exam is cumulative (covers all material, including those before the midterm.)
- Points on exams are generally based on your entire solution, not your final answer.
 - You can get full credit even when you have the wrong final answer.
 - You may get **zero** even when you write down a right answer without justification.

Lab Performance: 10%

- NOT entirely the same as lab attendance! However, coming to the lab on time is one of the factors.
- Pay attention to the brief summary of the lab at the start of each lab.
- Correctly follow the lab manuals and guideline provided by the instructor/TAs.
- Quickly notify the instructor if you find error in the manuals or the equipment do not work.

In-Lab Regulations

- Jeans, T-shirt, slippers, sandals, and bare feet are absolutely **NOT** allowed in the laboratory.
- Food and drink are **NOT** allowed.
- 15 minutes late = absent.
- Absent from two labs = “**F**”.
- Students are financially responsible for the loss or damage of instrument in the laboratory.
- After the lab,
 - Clean your desk
 - Put all the components (R, L, C, chips, cables, DMM) back to their places.

Question?

Lab 0

- Work on part IV (starting from page 11).
- Page 1-10 contains information about how to use many of the tools in our lab.
 - I will show you the necessary steps now so that you can work on the experiment in part IV.
 - Refer to pages 1-10 for more information during the lab.
 - Read them carefully at home.

What you need to do?

Table 3

	Part A		Part B		Part C		
	R_1	R_2	R_1	R_2	R_1	R_2	R_3
Resistance (Ω)							
Voltage (V)							
Current (A)							

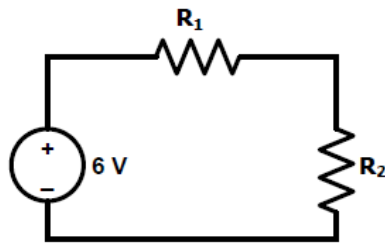


Figure 12: The circuit for Part A.

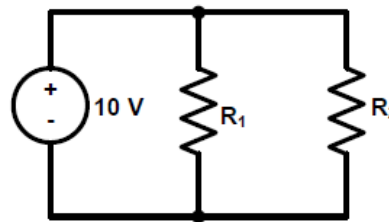


Figure 13: The circuit for Part B.

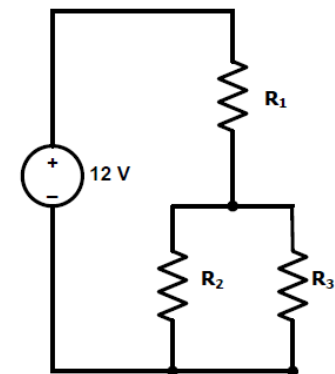
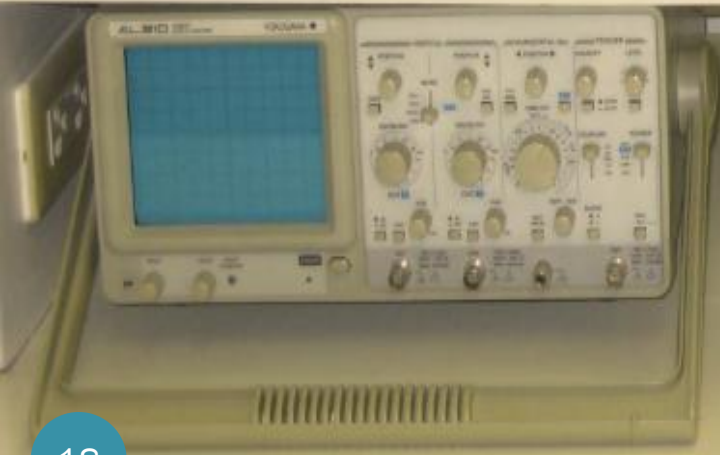


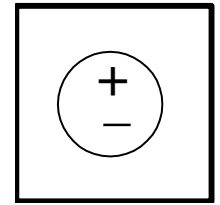
Figure 14: The circuit for Part C.



14



DC Power Supply



- Two variable voltage sources
- Floating
 - The voltage between the plus terminal and the minus terminals is a well-defined quantity which you can set at will.
- Current limit
 - Do not adjust the “current limit” knob on the power supply.
 - Only make sure that the red mark on the knob is located near the white mark
- The **red light** should be off if you connect the circuit correctly.
 - Turn the power supply off immediately and fix your circuit before you turn the power supply on again.

Digital Multi-Meter (DMM)

- Can measure
 - voltage across an element (voltmeter)
 - current passing through an element (amp-meter)
 - resistance (ohm-meter)
- Check three places before making measurement
 - Screen: DC or AC
 - Use the SELECT button to select DC or AC type of the measurements.
 - The rotary switch
 - The terminals

