MEE210 ELECTRICAL MACHINES – Experiment #4

LABORATORY CONTENT: Mutual inductance

EQUIPMENT REQUIRED: (students should bring electronic components)

Qty	Description
1	Voltage supply (will be ready at lab.)
1	Oscilloscope (will be ready at lab.)
1	Iron cylinder/rod/ (ferromagnetic material)
1	Plastic pulley (empty inside) (iron rod should get inside the empty part)
2	Amperemeter (you should bring your own amperemeters)
-	Wiring equipments (jumper cables, crocodiles, etc.)

CAUTION:

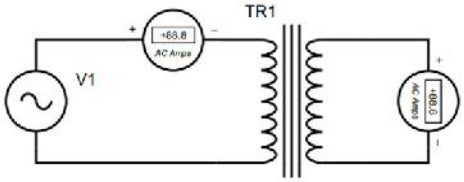
This experiment includes health and security threats with careless actions. Be cautious about the isolation and the heating problem (doubling the current increases the heat four times, tripling increases nine times!).

PRELIMINARY QUESTIONS:

1) Wrap a coil onto the plastic pulley. Wrap another coil next to it. Note number of turns of the first coil and the second coil.
2) Write down the general mutual inductance equation for the system.

EXERCISE STEPS:

1) Apply voltage to the to the electromagnet in 3 different current values with 50, 100 and 200 Hz. Then the fill the table.
2) Insert the iron rod into the pulley and repeat the steps.



	Air core		Iron core	
Frequency (Hz)	Primary current (A)	Secondary current (A)	Primary current (A)	Secondary current (A)
50				
100				
200				

POSTLIMINARY QUESTIONS:

1) What is the constant μ when the iron core is inserted?
2) What is the relationship between currents and the frequency?

IMPORTANT NOTE: For the next experiment, you need to build up some contents. So, the ones who are not prepared for the experiment will not be allowed to participate.