Lecture-1

Date: 01.08.2016

- Introduction
- Why this course?
- First-Order Circuit – Review

Circuit Theory and Device (ECE215)

Instructor: Dr. Mohammad S. Hashmi

TAs: Vijay Sharma, Antara Saxena

Class Timings: Monday (9:30 – 11:00) & Thursday (9:30 – 11:00)
Lab: Grp – 1 (Wed @ 9:00 – 12:00), Grp – 2 (Fri @ 9:00-12:00)
Tute: Grp – 1 (Fri@ 10:30 – 12:00), Grp – 2 (Wed @ 9:00 – 10:30)

Office Hours: Tuesday (14:00 – 16:00)

TA Office Hours: TBA

ECE215

Pre-requisites: Basic Electronics, Linear Algebra
Co-requisites: Signals and Systems, Differential Equations

Course URL:
Available at: http://www.iiitd.edu.in/~mshashmi/Teaching.html

Course Focus:
Circuit Analysis and Synthesis

Course Objectives:
On the completion of this course students should

- be able to analyze and synthesize electrical circuits
- be able to find circuit response using Laplace transform
- Be able to understand signal superposition and Fourier transform
- To be able to use industry standard SPICE tools for simple circuit analysis and synthesis

ECE215

Lab Component:

- Introduction to SPICE Tools – by TAs
- Advanced Topics is mostly self learning – may be assisted by the TAs

Evaluation:

- Assignments and Labs – 30% weightage
- [Pen & Paper + SPICE + MATLAB] based (all compulsory!)

- Class Tests (Surprise) – 20% weightage
- all compulsory!

- Mid-Sem (25%)
- End-Sem (25%)

ECE215

Attendance and Classroom Behavior:

- Attendance not mandatory (unless imposed by DOAA)
- Students will be responsible for any notes, announcements etc. made during the class
- Prompt arrival to the class is requested
- No eating, drinking, smoking allowed in the class

Text Books:

- Fundamental of Electric Circuits, *5th Edition*, *by* Alexander and Sadiku

Text Books:

- Network Analysis and Synthesis, *3rd Edition*, ***by*** Franklin F. Kuo

Course Website:

http://www.iiitd.edu.in/~mshashmi/Teaching.html

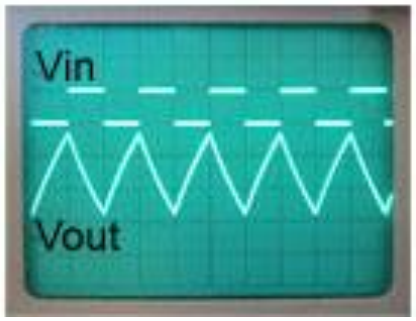
Info related to ECE215 can be found here

Important: We will have an assessment test

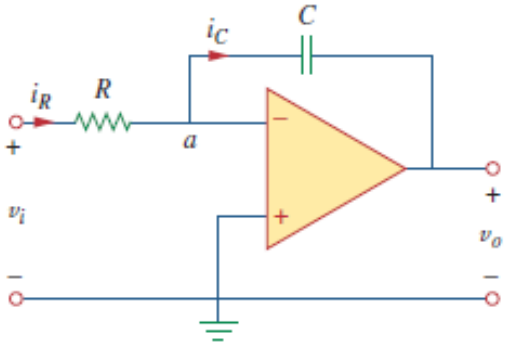
Why This Course?

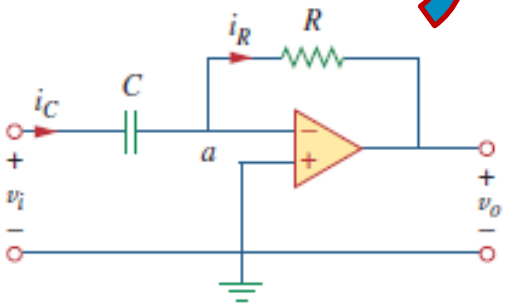
We talk about integration, differ enation, etc.?

Did you think about their realization ?



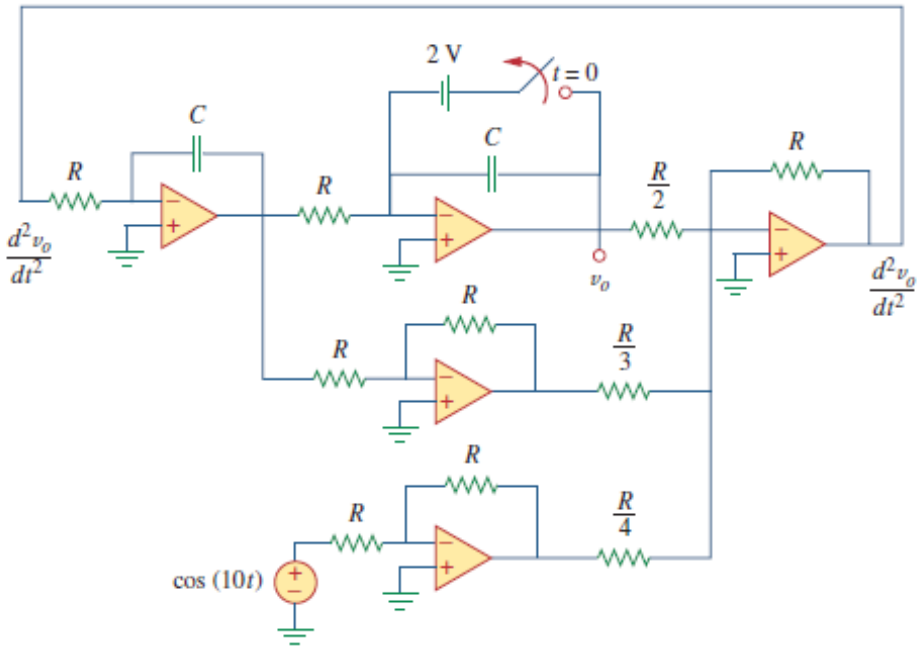
Simply: an inverting amplifier with a capacitor in the feedback loop





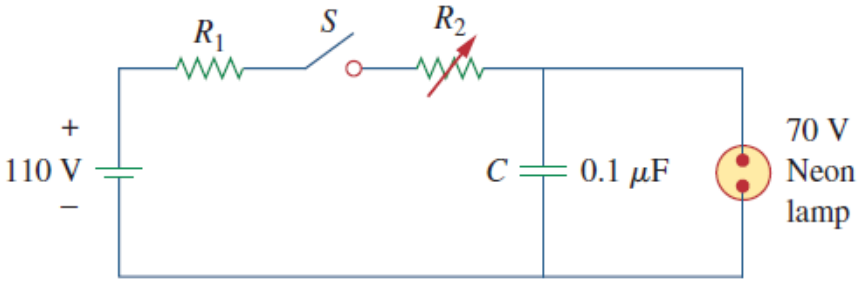
Why This Course?

How do you implement? $\frac{d^2v_0}{dt^2} + 3\frac{dv_0}{dt} + 2v_0 = 4\cos 10t$

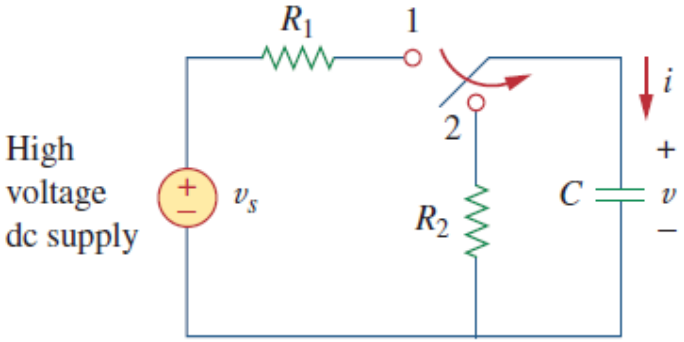


Why This Course?

How do you design delay circuits?



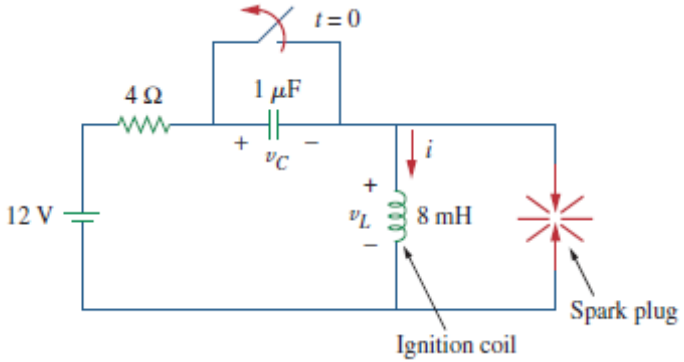
How about photo flash units?



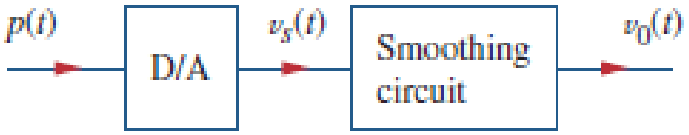
You learn these things through analysis of first-order circuits

Why This Course?

How about automobile ignition system?



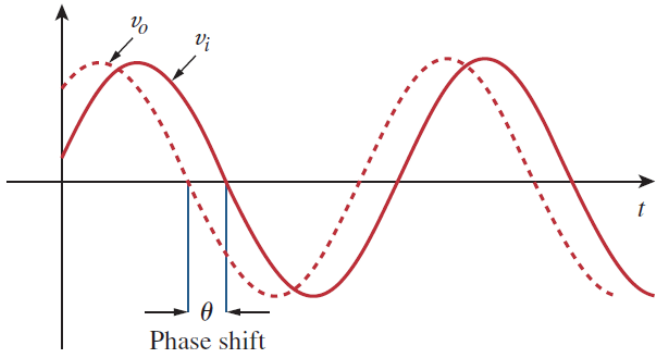
Smoothing circuit in Digital Communication System?

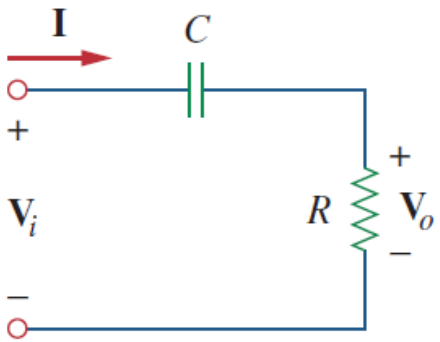


You learn these things through analysis of second-order circuits

Why This Course?

Phase shifter?

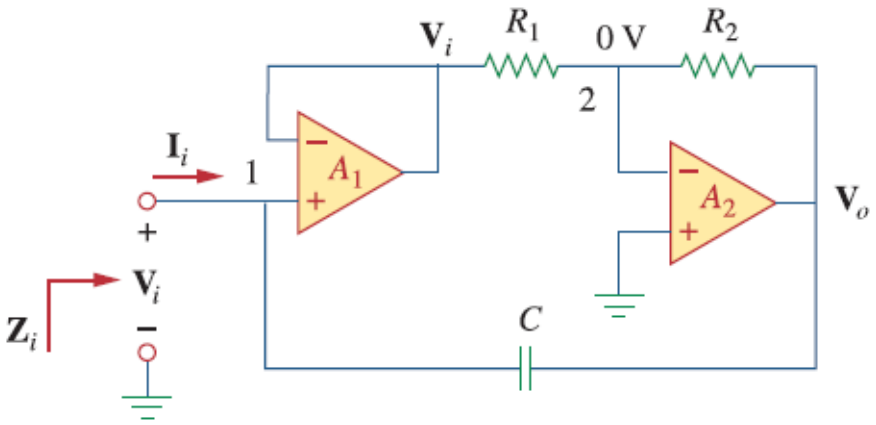




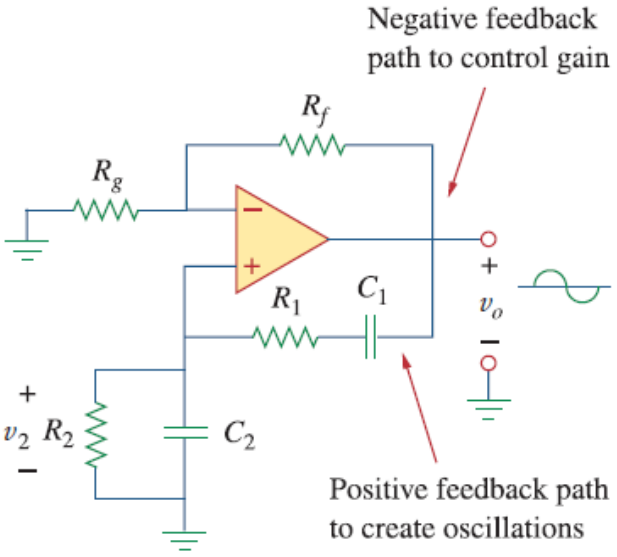
You learn these things through analysis of AC circuits

Why This Course?

How about capacitance multiplier for synthesis of high value capacitance?



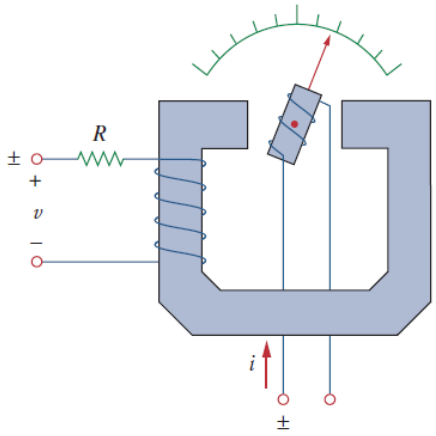
DC is produced by batteries but how about AC?

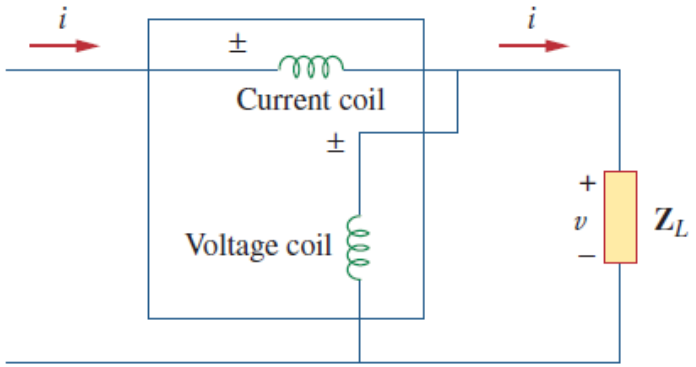


You learn these things through sinusoidal steady state analysis of circuits

Why This Course?

How to measure power? Using watt meter??



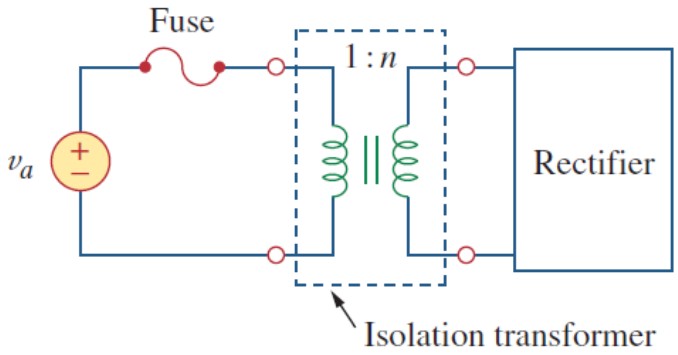


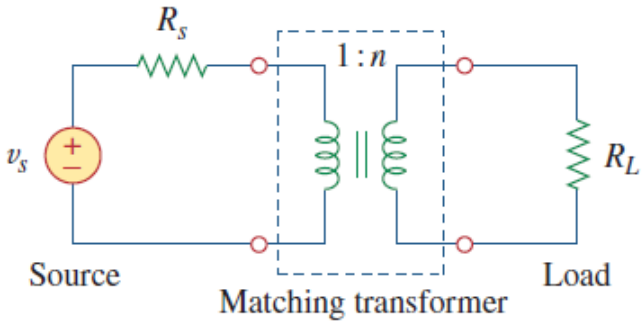
How do we calculate electricity consumption cost?

You learn these things through AC power analysis

Why This Course?

Transformer?? Applications in diverse domains!!!

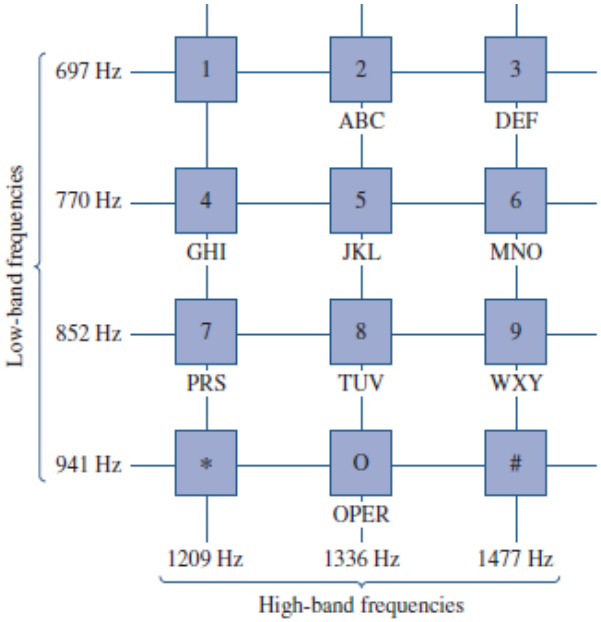


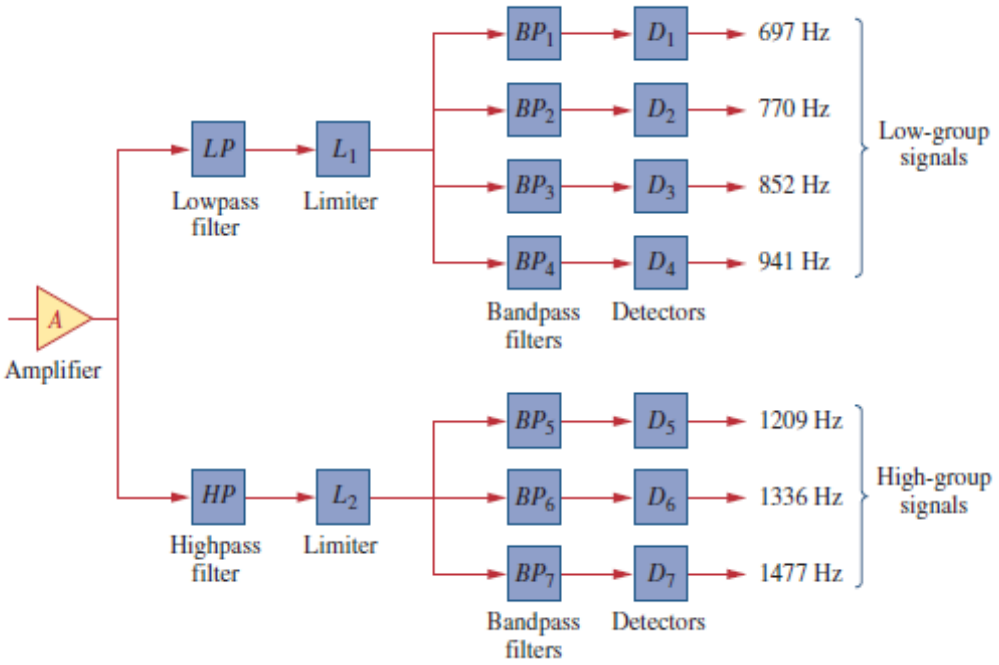


You learn these things through analysis of magnetically coupled circuits

Why This Course?

Touch tone telephone??





Requires understanding of frequency behavior of circuits

Similarly other aspects of this course has also important ramifications on advanced learning. So pay attention!

Q: I see! This course has lot many interesting usefulness but what about the useless mathematical analysis?

A: well, there is no free lunch!