

332:222 Principles of Electrical Engineering II– Spring 2016

Instructor: Professor P. Sannuti, Office - CoRE 525, Phone # 848-445-3127, **e-mail:** sannuti@rci.rutgers.edu

Office hours: Tuesday and Friday 10:20 AM – 11:30 AM or by appointment.

Course and lab Websites: Sakai Course Site for each.

Prerequisites: 332:221 Principles of Electrical Engineering I and 01:640:251 Multivariable Calculus

Co-requisite: 01:640:244 Differential Equations for Engineering and Physics

Text: Electric Circuits by James W. Nilsson and Susan A. Riedel, 10-th or 9-th Edition, Pearson – Prentice Hall.

Syllabus: The material is covered in the following order:

- Chapters 14 and 15 (Filters, the textbook material is enhanced by the class notes)
- Chapters 7 and 8th (Transient Response by solving differential equations)
- Portions of Chapters 12 and 13 (Transient Response via Laplace Transforms)
- Portions of Chapter 18 (Two-port Circuits)
- Portions of Chapter 11 (Balanced Three Phase Circuits)

Class Notes: I provide you often class notes. However, it is NOT necessarily a substitute for the text book. My notes is not complete, it is fragmented meaning that some times (although not often) there is no continuity from one topic or concept to the other.

Exams: All the exams will be closed book and closed notes. They emphasize both the theory and problem solving.

- There will be certain number of pop quizzes (unannounced). There is absolutely no excuse for missing a quiz. Quizzes are much simpler than hourly exams. There are possibly two or three hourly exams, and a final exam. The first hourly exam will be after we cover all the topics related to filters, it will be possibly either on Friday February 19th or Tuesday February 23rd, or Friday February 26th depending upon how fast we proceed.
- The final exam is cumulative. The date of final exam and the room will be announced shortly before the final exams begin.
- **No make up exams will be given.** If you have a medical excuse, consult Dean's office, B100 SOE Bldg.

Home Work (HW): Certain HW will be collected, not all collected HW is necessarily graded, only some of it is graded. See the instructions for submitting HW, **HW-instructions.pdf**.

Grade distribution: 2 % for each quiz, 10 % Filter design project. The weight placed on all the exams and HW will be announced possibly shortly after Exam 2. **If you miss any quiz and if you are on a border of two grades, you will get the lower grade.**

PSPICE and MULTISIM: These circuit simulating software are taught in lab periods.

Data of TAs:

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Further info will be provided later on.

ABET (Accreditation Board for Engineering and Technology) Syllabus: This can be found at http://www.ece.rutgers.edu/ug_course_descriptions/.

Important Comment: Nature of Principles of Electrical Engineering II (EE II) course is different in many respects from that of Principles of Electrical Engineering I (EE I):

- EE II introduces many more concepts than EE I.
- EE II is much more theoretical than EE I.
- Mathematical reasoning is much more important in EE II than in EE I.
- Each topic of EE II is heavily dependent on the topics covered earlier, consequently, all the exams stress mathematical reasoning, derivation of proofs, as well as problem solving techniques.

If you do not attend the classes or if you do not follow the course systematically, you will easily get lost although I will try my best to review what has been done earlier so that the burden is some what relieved.

Seek help whenever needed: My office hours as well as office hours of TAs are meant to help you. You are adults, I cannot hold you by hand and make you learn. Seek help whenever needed. **I trust you know that you are paying us to help you. We get paid whether you seek help or not.**

The **goals** of this course are **multifold** and are as listed below.

1. Study of frequency response characteristics of a given circuit or transfer function, and drawing Bode plots.
2. Study of passive and active first order and second order filter circuits.
3. Use of frequency and magnitude scaling in filter design.
4. Design of higher order filters by cascading first and second order filters.
5. Determination of complete response (initial condition response as well as input response) of first order and second order circuits by solving the circuit differential equations via classical methods of solving them.
6. Study of properties of delta function $\delta(t)$ and unit step function $u(t)$.
7. Study of Laplace Transform and some of its properties that enable us to solve for complete response of circuits.
8. Study of different two port parameters of a circuit and their interrelationships.
9. Analysis of balanced three phase circuits via the analysis of appropriate single phase circuits (the depth of covering will depend on the available time).