EE 203 - Circuit Analysis II (Required)

Course Description :
Circuit Analysis lies in the core of Electrical Engineering. Virtually every EE field of specialization -such as communications, signal processing, electronics, and power systems to name a few- depends on Circuit Analysis concepts and methodologies. In fact, it is frequently argued that the ideas and methods presented in this course are the most important to be encountered in the undergraduate Electrical Engineering curriculum. This indeed may be true, with the understanding, however, that the ultimate goal of a course in Circuit Analysis is not Circuit Analysis (!) but Circuit Design. Of course, to design one needs to be able to analyze and this is what real engineering is all about: An ongoing cyclic process of analysis and design efforts.

In EE 203 we begin with a brief review of the basic concepts of time-domain circuit analysis and then we cover phasor analysis of steady state ac circuits. Complex power and three-phase systems are studied in detail. The introduction of Laplace transform techniques leads to "s-domain" circuit analysis and the definition of the circuit transfer function. The transfer function takes us to the circuit frequency response and opens the door to linear circuit design. Selected problem assignments and a final design project require use of either PSPICE or WORKBENCH computer-aided circuit analysis software tools.

Prerequisite(s):
EE 202.

Textbook(s):
- D. E. Johnson, J. L. Hilburn, J. R. Johnson, and P. D. Scott "Electric Circuit Analysis," Prentice Hall, 3rd Edition, 1997.
- "Electric Circuit Analysis - Student Problem Set with Solutions," S. G. Conahan, Prentice Hall, 1996.

Course Objectives:
In addition to important applications such as power delivery, three-phase systems, and transformers, the major objective of this course is to present in a concise and rigorous manner the necessary foundation for Circuit Design (s-domain analysis, frequency response, design of linear filters).

Topics covered:
- Review of time-domain analysis (2 lectures).
- Sinusoids and Phasors (3 lectures).
- AC steady-state (3 lectures).
- AC power (2 lectures).
- Single-phase, three-phase systems (3 lectures).
- The Laplace transform and s-domain analysis (3 lectures).
- Frequency response and filter design (5 lectures).
- Mutual inductance and transformers (3 lectures).
- Course review (1 lecture).

Lecture/laboratory schedule:
Tuesday and Thursday 9:30am - 10:50am

Recitation/Problem Sessions Schedule:
Monday 12:00 - 12:50pm
Wednesday 12:00 - 12:50pm

Professional Significance:

EE 203 offers to students the methodologies and tools that are necessary to ‘‘read’’ (analyze) and ‘‘develop’’ (design) circuits. In addition to formal theoretical concepts and methods, the students are exposed to and use software development tools such as PSPICE and/or Workbench.

Course Role in Overall Program:

EE 203 - Circuit Analysis II is the sequel course to EE 202 - Circuit Analysis I. Together, EE 202 and EE 203 form the basis for the two-semester sequence of courses on Electronics that follows.

Relationship of Course to Program Outcomes

(a)	2	Real calculus, complex calculus, linear algebra, are all applied toward the analysis and design of circuits.
(b)	2	A final design project (worth 10% of the final grade) is required. The project involves the design of a linear filter.
(c)	2	The project sets explicit ideal design specifications. The objective of the students is to approximate the desired specifications as closely as possible based on their own knowledge of the pertinent material. A 2-week deadline for the completion of the work is strictly enforced.
(d)	1	Students are required to prepare and submit reports independently. Students in EE 203 are almost all with the EE or Computer Engineering or Computer Science program.
(e)	1	Students face open ended circuit/filter design problems (homework/test problems plus one design project). A significant percentage of the assigned homework problems require students to identify their own individual approach toward a solution.
(f)	1	The overall faculty-students interaction toward the satisfaction of the strict course requirements is by itself an excellent example of professional responsibility. No specific professional ethics lectures are given.
(g)	1	All tests and homework assignments require written technical reports. No form of oral examination is included in the course. Students, however, are strongly encouraged to interrupt and intervent in lectures with questions, concerns, and items for discussion.
(h)	1	Proposed solutions and their merits and societal implications (particularly with respect to power systems and delivery) are discussed.
(i)	1	The need for life-long learning engagement in this field is explicitly and repeatedly identified.
(j)	1	Up-to-date general information on everyday use circuits and systems is given.
(k)	2	Excellent course to help students identify quickly necessary math skills that they may have failed to acquire. Continued use of PSPICE (computer software).
(ee1)	1	The course teaches concepts and skills that are basic in the field of EE.
(ee2)	1	The course emphasizes fundamental knowledge of linear circuit principles and basic circuit analysis and design methodologies. Some contemporary issues, particularly on filter design, are covered. The use of modern software design/analysis tools is enforced (PSPICE and/or Workbench).
(ee3)	2	EE 203 is an essential building block for other courses to come that identify research
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Prepared by:

Dimitris A. Pados, Assist. Prof. (March 23, 2002).