Required Course:	**ECE 20200Linear Circuit Analysis II**
Credit and contact hours:	(3 cr.) Class 3
2014-16 IUPUI Campus Bulletin description:	ECE 20200 Linear Circuit Analysis II (3 cr.) P: ECE 20100. P or C: MATH 26600. Class 3. Continuation of ECE 20100. Use of computer-aided design programs. Complex frequency plane, resonance, scaling, and coupled circuits. Two-port network parameters. Laplace transform methods. Use of general loop and nodal equations, matrix formulations.
Prerequisite or corequisite:	P: ECE 201. C: MATH 266
Prerequisites by topic:	DC, transient, and sinusoidal steady-state AC analysis of linear electrical circuits (ECE 201)
Textbook:	C. K. Alexander and M. N. O. Sadiku, *Fundamentals of Electric Circuits*, 4'th ed., McGraw-Hill, 2009. ISBN: 0073529559
Coordinator:	Steven Rovnyak, Associate Professor of Electrical and Computer Engineering
Goals:	This course is designed to teach the student to apply previously acquired knowledge of linear circuit analysis (ECE 201) to new concepts of circuit characterization. Students must acquire a working knowledge of Laplace transforms and their use in circuit analysis. They must also acquire competency in the use of PSpice and Matlab for circuit analysis, design and simulation.
Outcomes:	Upon successful completion of the course, students should be able to 1. Compute impedances and admittances of components and circuits. [a,e,k] 2. Compute responses of linear circuits with and without initial conditions via one-sided Laplace transform techniques. [a,e,k,PC1] 3. Compute responses to linear circuits using transfer function and convolution techniques. [a,e,k,PC1] 4. Analyze and compute responses of linear circuits containing mutually coupled inductors and ideal transformers in the s-domain. [a,e,k,PC1] 5. Analyze basic two port circuits using the various types of two port parameters and be able to construct such parameters from a given circuit. [a,e,k] 6. Analyze and design basic LP, BP, HP and resonant circuits in the s-domain. [a,e,k,PC1]
Topics:	1. Magnetic Coupling, mutual inductance (2 classes) 2. Ideal transformers, linear transformers (2 classes) 3. Two-port parameters (2 classes) 4. Passive frequency selective circuits: Band pass, low pass, high pass filters (3 classes) 5. Step function, delta function, and LaPlace transforms (4 classes) 6. Complex frequency, natural frequency, poles and zeros (2 classes) 7. Use of PSpice with schematic capture for steady-state and transient analysis (2 classes) 8. Use of Matlab for circuit analysis (2 classes)

	9. Circuit analysis with s-domain (2 classes) 10. Transfer functions (1 class) 11. Natural response, convolution (3 classes) 12. Exams and Quizzes (5 classes and final exam period)
Computer usage:	Circuit simulation using PSpice. MATLAB circuit analysis.
Evaluation methods:	Five midterm exams or quizzes, 10-15 homework assignments including 4-5 MATLAB or PSPICE problems, and final comprehensive exam.
Laboratory projects:	None.
ABET category:	Engineering science 100%, engineering design 0%.
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