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| **Course** | ECE 20200 - Linear Circuit Analysis II |
| **Type of Course** | Required for the CmpE and EE programs |
| **Catalog Description** | Continuation of ECE 20100. Use of Laplace Transform techniques to analyze linear circuits with and without initial conditions. Characterization of circuits based upon impedance, admittance, and transfer function parameters. Determination of frequency response via analysis of poles and zeros in the complex plane. Relationship between the transfer function and the impulse response of a circuit. Use of continuous time convolution to determine time domain responses. Proprieties and practical uses of resonant circuits and transformers. Input - output characterization of a circuit as a two-port. Low and high-pass filter design. |
| **Credits** | 3 |
| **Contact Hours** | 3 |
| **Prerequisite Courses** | ECE 20100 |
| **Corequisite Courses** | MA 36300 |
| **Prerequisites by Topics** | Elementary linear circuit analysis including dc, transient, and phasor techniques. |
| **Textbook** | J. W. Nilsson and S. A. Riedel, *Electric Circuits*, Prentice Hall, 10th Ed, Pearson, 2014. |
| **Course Objectives** | This course will provide an advanced understanding of linear circuit analysis by using time and complex frequency domain techniques. The following topics will be covered: Laplace Transform, Frequency Selective Circuits, Active Filter Circuits, Fourier Series, Fourier Transform, Two-Port circuits. |
| **Course Outcomes** | 1. Students who successfully complete this course will have demonstrated:<br>2. An understanding of the concept of Laplace Transform (1). |

3. An ability to use Laplace Transform to understand the behavior of linear circuits (1).
4. An ability to analyze and design basic frequency selective circuits in the s-domain (2).
5. An understanding of the concept of Fourier series and Fourier Transform (1)**.**
6. An ability to use Fourier Transform to find the response of a linear circuit (1) .
7. 7.    An understanding of the concept of two-port circuits and applications (2).
8. Analyze and compute responses of linear circuits containing mutually coupled inductors (1).

**Lecture Topics**

1. Introduction to the Laplace Transform
2. Laplace Transform with application to circuit analysis
3. Introduction to frequency selective circuits
4. Fourier series with application to circuit analysis
5. The Fourier Transform with application to circuit analysis
6. Two-port circuits
7. Analysis of circuits with Mutually coupled inductors

**Computer Usage**          Low

**Laboratory Experience**   None

**Design Experience**       Low

**Coordinator**             Hossein M. Oloomi, Ph.D.

**Date**                    10/01/2018