EE 400

1. **Course Number and Name:** EE 400, Linear Systems Theory

2. **Course Credit and Contact hours:** 3 Units, 3 hours

3. **Course Coordinator:** Dr. Mohamed Salem


5. **Supplemental Materials:** Software: Mathworks MATLAB or GNU Octave

6. **Specific Course Information:**
   a. **Description:**
      Analysis of linear time-invariant systems, correlation, convolution, impulse response, complex variables, Fourier series and transform, sampling, filtering, modulation, stability and causality, feedback and control systems, Laplace and Z-transform, and fast Fourier transforms.
   b. **Prerequisites:** MATH 241 and MATH 211, or consent of instructor.
   c. **Co-Requisite:** None
   d. **Status:** ☑ Required for EE program, ☐ Elective, ☐ Selected Elective

7. **Specific goals for the course**
   a. **Specific outcomes of instruction:** Upon successful completion of this course the students will be able to:
      i. Analyze linear time-invariant systems using impulse response and convolution.
      ii. Determine Fourier series for periodic signals.
      iii. Determine Fourier transform and inverse Fourier transform for signals.
      iv. Determine Laplace transform and inverse Laplace transform for signals.
      v. Analyze linear time-invariant systems using frequency domain methods.
      vi. Understand sampling and the sampling theorem.
      vii. Determine Z-transform and inverse Z-transform for discrete-time signals.
   b. **This course supports the following ABET Student Outcomes**
      i. **SO-1:** an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
8. Brief list of topics to be covered:
   a. Introduction to signals and systems
   b. Linear time-invariant systems properties
   c. Time-domain analysis of linear time-invariant systems
   d. Fourier representation of signals
   e. Fourier transform
   f. Sampling
   g. Laplace transform
   h. Z-transform