Department: Electrical and Computer Engineering

**EEE4510 — Digital Signal Processing**

**Curriculum Designation:** Selective elective for EE majors. Elective for CpE majors

**Course (Catalog) Description:** Discrete-time linear systems, finite duration impulse response digital filters, infinite impulse response digital filters, finite wordlength effects, spectral analysis, fast Fourier-transforms, two-dimensional signal processing and applications.

**Prerequisite:** EEL3135

**Text and/or other required material:** DIGITAL SIGNAL PROCESSING, Author: MITRA, Publisher: MCGRAW HILL, Edition: FOURTH

**Instructional Objectives:** After completing the course the students will be able to:
1. Analyze discrete-time linear systems
2. Analyze sampling and quantization
3. Design finite duration impulse response digital filters
4. Design infinite duration impulse response digital filters
5. and mitigate finite wordlength effects in DSP algorithms
6. Perform Spectral analysis
7. Derive fast Fourier-transform algorithms
8. Analyze multi-rate DSP systems
9. Design and analyze DSP systems using MATLAB and/or Labview

**Topics covered:**
1. Introduction: What is DSP?
2. Spectrum and Sampling
3. Linear Systems and Transforms, Spectral Analysis
4. Phase, and the Analytic Signal
5. Implementations: Structure and Finite Wordlength Effects
7. FFT algorithms
8. Multi-rate (clock) Systems

**Class Schedule:** Three 50 minute or two 75 minute lectures per week (3 credit hours).

**Subject Area:** Engineering

**Significant Design:** Yes

**Relationship to Assessed ABET Student Outcomes:** None

**Last Updated by:** R.J. Perry  
**Date:** 4/30/2021