**COURSE:** EECS 451. **TITLE:** Digital Signal Processing and Analysis. **PREREQUISITES:** EECS 306. **ELECTIVE.**


**COURSE OBJECTIVES:**
1. To teach students concepts of discrete-time signals: properties, frequency content, and aliasing;
2. To teach students concepts of linear time-invariant discrete-time systems, including representations, properties, convolutional relationship, and analysis techniques based on Fourier and Z transforms;
3. To introduce the concepts of, and methods for, FIR and IIR digital filter design using Matlab.

**TOPICS COVERED:**
1. Discrete time signals and systems in time and frequency domains
2. Derive Nyquist sampling theorem
3. Z-transforms and difference eqns
4. DTFT & DTFS; computing them
5. Design and implementation of FIR and IIR digital filters
6. Discrete Fourier transform (DFT)
7. Fast Fourier Transform (FFT)

**PROGRAM OUTCOMES ADDRESSED:** 1,3,11

**ASSESSMENT (Course outcomes)**
1. Weekly problem sets [1,2,3,4,5]
2. 3 closed-book exams [1,2,3,4,5]

**CLASS/LABORATORY SCHEDULE:**
- **LECTURES:** 3 per week @ 50 minutes.
- **RECITATION:** 1 per week @ 60 minutes

**PREPARED BY:** Andrew E. Yagle on Nov. 25, 2004

**COURSE DESCRIPTION:** University of Michigan, College of Engineering, ELECTRICAL ENGINEERING PROGRAM