

The Ohio State University
Department of Electrical & Computer Engineering

ECE 600 — INTRODUCTION TO DIGITAL SIGNAL PROCESSING

Course Objectives

From your experience in ECE600, you should be able to specify and use a DSP system for application within your domain of expertise in science or engineering. You should be able to interpret filtered signals and frequency representations. Below are listed several specific course objectives.

- understand the advantages and limitations of digital versus analog processing
- understand consequences of linearity and shift-invariance for a system model
- interpret magnitude and phase responses for linear shift-invariant systems
- understand the frequency content of a sampled signal
- specify an appropriate sampling rate and understand the effects of aliasing
- understand the requirements for anti-aliasing and reconstruction filters
- describe the operation of direct digital down-conversion
- implement and interpret a DFT on sampled data
- understand computational savings of an FFT routine for computing the DFT
- understand the effects of windowing and data length on DFT results
- understand how and when to use a digital frequency selective filter
- understand filter specifications and the necessity for approximation
- design and apply FIR filters
- design and apply IIR filters
- understand trade-offs between filter types; understand the effects of filter order
- understand demands of real-time versus off-line processing
- understand dynamic range and preconditioning
- understand the effect of wordlength on design, speed, and cost
- specify alias-free spatial sampling for linear arrays
- design a beamformer