

- Discrete-Time Fourier Transform (DTFT)
  - Basic Signals and Systems
  - Convolution
  - FIR and IIR Filters
  - DTFT: Transform Pairs
  - DTFT Properties
  - Relation to Continuous-Time Fourier Transform
  - Random Signals
  - Correlation
  - Filtering of Random Signals
  
- Bilateral z Transform
  - Transform Pairs and Properties
  - Relationship to DTFT
  - Partial Fraction Expansion
  - Difference Equations and IIR Filters
  - Stability and Causality
  
- Sampling of Continuous-Time Signals
  - Sampling Theorem
  - Frequency-Domain Representation of Sampling
  - Discrete-Time Processing of Continuous Signals
  - Changing the Sampling Rate
  - Oversampling and Noise Shaping
  - Quantization Noise
  
- Transform Analysis of FIR and IIR Filters
  - Linear Phase
  - Frequency Response and Pole Zero locations
  - All-pass Filters
  - Minimum Phase
  - Generalized Linear Phase Systems
  
- Digital Filter Implementation
  - Basic Structures for FIR and IIR Filters
  - Signal Flow Graph Representation
  - Quantization Noise
  - Finite Word Length Effects
  - Effects of Coefficient Quantization
  - Effects of Round-Off Noise
  
- Digital Filter Design
  - Bilinear Transformation
  - Butterworth, Chebyshev, Elliptic Filters
  - Windowing
  - Chebyshev Approximation (Optimal Filters)
  
- Discrete Fourier Transform (DFT)
  - Transform Pairs and Properties
  - Sampling the Fourier Transform
  - Circular Convolution
  - High-Speed Convolution Using DFT
  - Discrete Cosine Transform DCT (Time Permitting)
  
- Computation of DFT via the FFT Algorithm
  - Decimation-in-Time FFT
  - Decimation-in-Frequency FFT