Signal processing course general

1. Basics of Digital Signal Processing
   1.1. Introduction to DSP
   1.2. Discrete-time signals
   1.3. Basic signal processing
   1.4. Complex exponentials

2. Vector spaces
   2.1. Signal processing and vector spaces
   2.2. Vector spaces
   2.3. Bases
   2.4. Subspaces and approximations

3. Basics of Fourier Analysis
   3.1. Introduction to Fourier Analysis
   3.2. Discrete Fourier Transform
   3.3. DFT in practice
   3.4. Short-Time Fourier Transform
   3.5. Discrete Fourier Series
   3.6. Discrete-Time Fourier Transform
   3.7. Sinusoidal Modulation

4. Introduction to Filtering
   4.1. Linear Filters
   4.2. Filtering by example
   4.3. Filter stability
   4.4. Frequency response
   4.5. Ideal filters
   4.6. Filter design part 1: Gibbs phenomenon, window method, frequency sampling
   4.7. Realizable Filters
   4.8. Filter design part 2: Intuitive IIR designs
   4.9. Filter design part 3: filter specs, IIR, FIR design

5. Sampling and Quantization
   5.1. Continuous-time world
   5.2. Interpolation
   5.3. Sampling of bandlimited functions
   5.4. Sampling of non bandlimited functions
   5.5. Quantization

6. Digital communication systems
   6.1. Intro to digital communication systems
   6.2. Controlling the bandwidth
   6.3. Controlling the power
   6.4. Modulation and demodulation
   6.5. Receiver design
   6.6. ADSL