



# Full Syllabus

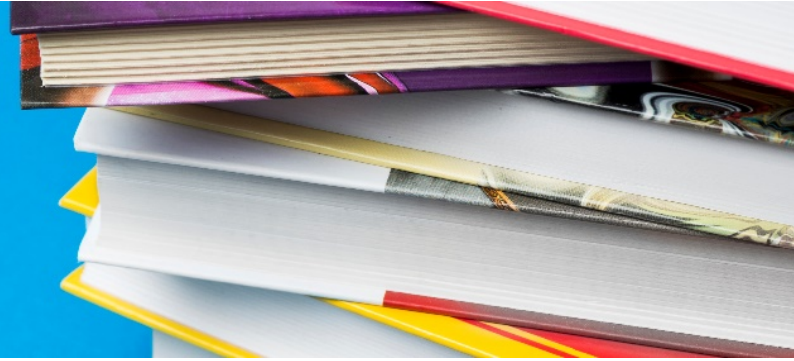


<b>Course Title</b>	
Introduction to Digital Signal Processing	
<b>Lecturer</b>	
Professor Anthony J. Weiss	
<b>Semester</b>	
1	
<b>Course requirements</b>	
Submission of 6 biweekly homework assignments, 15 weekly MATLAB assignments, 10 open weekly quizzes, 7 weekly multiple choice quizzes, 2 mock final exams, 1 final 3 hour exam.	
<b>Final grade components</b>	
80% final exam, 5% Homework assignments, 5% MATLAB assignments, 5% open weekly quizzes + multiple choice quizzes, 5% two mock final exams.	
<b>Course schedule</b>	
<b>Class no. / Date</b>	<b>Subject and Requirements (assignments, reading materials, tasks, etc.)</b>
1-2	The Z transform, review and extensions. Pole Zero and region convergence(ROC) analysis, relation to stability and causality. Inverse Z transform. Transform analysis of linear time invariant (LTI) systems. Minimum phase systems.
3-4	Discrete time processing of continuous time signals, review and extensions. Sampling rate conversions. Polyphase decompositions.
5-6	Design of digital filters. Design of infinite impulse response (IIR) filters from analog filters. Design of finite impulse response (FIR) filters, windows and frequency sampling. Linear phase filters. Optimal (minimax) design of FIR filters.
7-8	Discrete Fourier series (DFS). Discrete Fourier transform (DFT). Circular convolution and linear convolution using the DFT.
9-10	The fast Fourier transform (FFT) for fast calculation of the DFT. Decimation in time and decimation in frequency (FFT). The Goertzel algorithm. The chirp transform algorithm.
11-12	The discrete cosine transform (DCT).
13	Spectral analysis using short time Fourier transform.
<b>Required course reading</b>	
<ul style="list-style-type: none"> <li>Discrete Time Signal Processing, A.V. Oppenheim and R.W. Schaffer, third edition, Prentice Hall 2010.</li> </ul>	



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**Optional course reading**

**Comments**