

6.342: Wavelets, Approximation, and Compression
Spring 2009

Tentative Course Schedule

Day	Date	Topic, notes, etc.	Readings	Out	In
W	4-Feb	L1 Course overview	Ch. 0	PS1	
M	9-Feb	L2 Euclid to Hilbert: Vector spaces, inner products, completeness, bases	Ch. 1		
T	10-Feb	<i>No VKG office hour</i>			
W	11-Feb	No lecture — cancelled to compensate for evening exam			
T	17-Feb	L3 Basic signal processing (MIT on Monday schedule) <i>No VKG office hour</i>	Ch. 2-3		
W	18-Feb	L4 Sampling and interpolation	Ch. 4	PS2	PS1
M	23-Feb	L5 Uncertainty principles, time-frequency plane	Ch. 5		
W	25-Feb	L6 From finite-dimensional uncertainty principles to compressed sensing	TBD		
M	2-Mar	L7 Two-channel filter banks: Concept, orthogonal case	§6.0-6.2		
W	4-Mar	L8 Two-channel filter banks: Design, biorthogonal case, polyphase form	§6.3-6.5	PS3	PS2
F	6-Mar	<i>Add date</i>			
M	9-Mar	L9 Iterating filter banks, orthogonal discrete wavelet transforms	§7.0-7.2		
W	11-Mar	L10 DWT approximation properties, variations	§7.3-7.4		
M	16-Mar	L11 Guest lecture on industrial applications (no Open Hour)		PS4	
T	17-Mar	<i>No VKG office hour</i>			
W	18-Mar	No lecture — cancelled to compensate required project meetings			PS3
M	23-Mar	No lecture — Spring Break			
W	25-Mar	No lecture — Spring Break			
M	30-Mar	L12 Limits of iterated filters: convergence to scaling function	§8.0-8.2		
W	1-Apr	L13 Orthonormal bases of wavelets	§8.3		
M	6-Apr	L14 Frames: generalities, linear analysis, linear synthesis	Ch. 10		PS4
W	8-Apr	L15 Frames: analysis and synthesis flexibility, algorithms Midterm Exam , 7:30pm-10:00pm, room TBA <i>Exam covers through L14 and PS4</i>	Ch. 10 (cont.)		
M	13-Apr	L16 Linear vs. nonlinear approximation; sparse approximation	Ch. 12		
W	15-Apr	L17 Approximation; Bayesian and minimax estimation	Ch. 12 (cont.)		Proposal
M	20-Apr	No lecture (also no Open Hour) — Patriots Day			
W	22-Apr	L18 Source coding basics; high-rate quantization theory, transform coding	Gray/Neuhoff IT 1998 Goyal SPM 2001		
R	23-Apr	<i>Drop date</i>			
M	27-Apr	L19 Wavelet-based compression of images, JPEG2000	Taubman/Marcellin 2002		
W	29-Apr	L20 TBD (intentional schedule slack)			
M	4-May	L21 Project presentations			
W	6-May	L22 Project presentations			
F	8-May	* Possible extra course meeting for project presentations			
M	11-May	L23 Project presentations			
W	13-May	L24 Project presentations			Report

(No final exam)