Date	Lecture	Reading		HW out	HW due
1/22 (M)	**Introduction to Computational imaging** - Forward problems - Inverse problems - Common optical imaging problems	IIP 1		**HW 1: Review of 2D FT**	
1/24 (W)	**Basics for Forward problem in linear shift-invariant imaging** - Fourier analysis - convolution, transfer function - linear operators and its adjoint	IIP 2.1, 2.2, 3			
1/29 (M)	Cancelled				
1/31 (W)	**Forward problem in linear operator form for shift-invariant imaging** - linear operators and its adjoint	IIP 2.3, Appx. A-B			
2/5 (M)	**Forward problem in linear operator form for shit-invariant imaging** - sampling - convolution matrix and its properties	IIP 2.4-2.7		**HW2: LSI forward model 1**	**HW1**
2/7 (W)	**Forward problem in linear operator form for shit-invariant imaging** - sampling - convolution matrix and its properties	IIP 2.3, Appx. A-B			
2/12 (M)	**Forward problem in linear operator form for shit-invariant imaging** - sampling - convolution matrix and its properties	IIP 2.4-2.7			
2/14 (W)	**Forward problem in matrix form** - sampling - convolution matrix and its properties - Eigenvalue decomposition & transfer function relations	IIP 2.4-2.7			
2/19 (M)	**Presidents' Day Holiday**				
2/21 (W)	**Forward problem in matrix form** - sampling - convolution matrix and its properties - Eigenvalue decomposition & transfer function relations	IIP 2.4-2.8		**HW 3: LSI Forward model 2**	**HW 2**
Group project topics out					
2/26 (M)	**Linear inversion without regularizations LSI** - ill-posed vs ill-condition problems - deconvolution	IIP 4 IIP Appx. E			
2/28 (W)	**Linear inversion LSI** - ill-posed vs ill-condition problems - deconvolution	IIP 5 IIP Appx. E			
3/4 (M)	**Linear inversion LSI** - ill-posed vs ill-condition problems - deconvolution	IIP 5 IIP Appx. E		**HW 4: LSI inversion**	**HW3**
3/6 (W)	**Linear inversion LSI** - ill-posed vs ill-condition problems - deconvolution	IIP 5 IIP Appx. E			
End of group project topic selection					
Spring Recess					
3/18 (M)	**Forward problem for shift-variant imaging** - operator & matrix form - singular value decomposition	IIP 8 IIP 9.1-9.2 IIP Appx. A-D		**HW 5: LSV forward model**	**HW 4**
3/20 (W)	**Inverse problem of LSV** -Least square solution -Tikhonov regularization - truncated SVD	IIP 10.1-10.3 IIP Appx. E			
3/25 (M)	**Inverse problem of LSV** -Least square solution -Tikhonov regularization - truncated SVD	IIP 10.1-10.3 IIP Appx. E			
Group lectures begin					
3/27 (W)	Selected Topic in computational imaging		Group 1		
4/1 (M)	Selected Topic in computational imaging		Group 2	**HW 6: LSV inversion**	**HW 5**
4/3 (W)	Selected Topic in computational imaging		Group 3		
4/8 (M)	Selected Topic in computational imaging		Group 4		
4/10 (W)	Selected Topic in computational imaging		Group 5		
4/15 (M)	**Patriots' Day Holiday**				
4/17 (W)	Selected Topic in computational imaging		Group 6		**HW 6**
4/22 (M)	Cancelled				
4/24 (W)	Selected Topic in computational imaging		Group 7		
4/29 (M)	**Final Projects**		**Group 1-4**		
5/1 (W)	**Final Projects**		**Group 5-7**		

Required Textbook

M. Bertero, P. Boccacci, Introduction to Inverse Problems in Imaging

Additional References

J. Goodman, Introduction to Fourier Optics, 4th Edition

A. Kak, M. Slaney, Principles of Computerized Tomographic Imaging