Bioeng 280A: Principles of Biomedical Imaging **10/11/04**
Fall Quarter 2004

Revised Syllabus

Week 1		
Thursday	9/23	Introduction, Course Policies, Overview of Imaging Modalities
Week 2		
Tuesday	9/28	Linear systems: linearity, delta functions, superposition integral, shift invariance, 1D and 2D convolution, examples.
Thursday	9/30	Fourier Transforms: 1D FT, basis functions, FT properties, duality
Week 3		
Tuesday	10/5	Fourier Transforms: 2D FT, basis functions, properties, duality
Thursday	10/7	Sampling: 1D and 2D sampling, Whitaker-Shannon sampling theorem, aliasing
Week 4		
Tuesday	10/12	Sampling continued, Windowing, Resolution. Discrete Fourier Transform:
Thursday	10/14	MRI: Basic physics, Bloch Equation
Week 5		
Tuesday	10/19	MRI: Gradients, Signal Equation, k-space trajectories
Thursday	10/21	MRI: sampling requirements, slice selection, image contrast
Week 6		
Tuesday	10/26	MRI: angiography, arterial spin labeling, diffusion imaging, fMRI
Thursday	10/28	Noise
Week 7		
Tuesday	11/2	Least squares Estimation and Inverse Theory
Thursday	11/4	X-Rays, CT: physics and hardware
Week 8		
Tuesday	11/9	CT: Radon transform, filtered back projection
Thursday	11/11	NO CLASS. Veteran's Day Holiday
Week 9		
Tuesday	11/16	Ultrasound: echo equation, impulse response, diffraction
Thursday	11/18	Ultrasound: phased array systems, beam formation, Doppler
Week 10		
Tuesday	11/23	Nuclear Imaging Modalities, Molecular Imaging
Thursday	11/25	NO CLASS. Thanksgiving Holiday
Week 11		
Tuesday	11/30	Optical Imaging, EEG, MEG
Thursday	12/2	TBD