Bioengineering 280A: Principles of Biomedical Imaging **9/21/06**
Fall Quarter 2006

Preliminary Syllabus

Week 1	
Thursday 9/21	Course Policies, Overview of Imaging Modalities; Intro to X-rays.
Week 2	
Tuesday 9/26	X-rays: Basic Physics; Contrast; Noise; Image Equation
Thursday 9/28	Linear systems, 1D and 2D convolution; Resolution; Application to X-rays
Week 3	
Tuesday 10/03	CT: Overview and basic Physics, Radon transform
Thursday 10/05	Fourier Transforms: Overview and basic properties
Week 4	
Tuesday 10/10	Fourier Transforms and Convolution, Duality, Windowing, Resolution
Thursday 10/12	CT: Projection Slice Theorem; Filtered back projection
Week 5	
Tuesday 10/17	Sampling: 1D and 2D sampling, Whitaker-Shannon sampling theorem, aliasing; Application to CT
Thursday 10/19	CT: Advanced Topics and Applications
Week 6	
Tuesday 10/24	Ultrasound: Overview and basic physics
Thursday 10/26	Ultrasound: Beam formation, Scanning modes
Week 7	
Tuesday 10/31	Sampling Reviewed; Ultrasound: Phased Array systems, Doppler
Thursday 11/02	MRI: Overview, Basic physics, Bloch Equation
Week 8	
Tuesday 11/07	MRI: Gradients, Signal Equation, Spin-warp pulse sequence
Thursday 11/09	Sampling Reviewed; MRI: Resolution and sampling requirements
Week 9	
Tuesday 11/14	MRI: Slice Selection; RF Pulse design.
Thursday 11/16	MRI: Image Contrast and Noise
Week 10	
Tuesday 11/21	MRI: Applications
Thursday 11/23	Thanksgiving Holiday
Week 11	
Tuesday 11/28	Special Topics
Thursday 11/30	Special Topics