Tentative Syllabus

Week 1
Thursday 9/25  Course Policies, Overview of Imaging Modalities; Intro to X-rays.

Week 2
Tuesday 9/30  X-rays: Basic Physics; Contrast; Noise; Image Equation
Thursday 10/02  Linear systems, 1D and 2D convolution; Resolution; Application to X-rays

Week 3
Tuesday 10/07  CT: Overview and basic Physics, Radon transform
Thursday 10/09  Fourier Transforms: Overview and basic properties

Week 4
Tuesday 10/14  Fourier Transforms and Convolution, Duality, Windowing, Resolution
Thursday 10/16  CT: Projection Slice Theorem; Filtered back projection

Week 5
Tuesday 10/21  Sampling: 1D and 2D sampling, Whitaker-Shannon sampling theorem, aliasing; Application to CT
Thursday 10/23  MRI: Overview, Basic physics, Bloch Equation

Week 6
Tuesday 10/28  MRI: Gradients, Signal Equation, Spin-warp pulse sequence
Thursday 10/30  Sampling Reviewed; MRI: Resolution and sampling requirements

Week 7
Tuesday 11/04  MRI: Slice Selection; RF Pulse design
Thursday 11/06  MRI: Image Contrast and Noise

Week 8
Tuesday 11/11  NO CLASS: Veterans Day Holiday
Thursday 11/13  MRI: Fast Imaging Methods

Week 9
Tuesday 11/18  MRI: Advanced Image Reconstruction
Thursday 11/20  MRI: Applications

Week 10
Tuesday 11/25  Ultrasound: Overview and basic physics
Thursday 11/27  NO CLASS: Thanksgiving Holiday

Week 11
Tuesday 12/02  Ultrasound: Beam formation; Scanning; Sampling Reviewed
Thursday 12/04  Ultrasound: Phased Array systems, Doppler

Week 12
Finals Week  Final project presentations (8 am to 11 am) on day of scheduled final.