

GMS 6080 BASIC MAGNETIC RESONANCE IMAGING-FALL 2017

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Class meets in the McKnight Brain Institute, Room L1-101, every Tues and Thurs at 1pm – 3pm.

The course runs from 9/26/2017 through 10/30/2017.

This is a very soft course. With virtually no math (but at points I give handouts of relevant math for those interested) I cover:-

1. Origin of the MR signal, basic electromagnetics
2. T1, T2, spin echoes, T2*, gradient echoes
3. The basics of MR spectroscopy and why its cool.
4. The Fourier Transform in pictorial form
5. How gradients really work - phase encoding
6. Leads to 2D Fourier imaging basic pulse sequences
7. And finally k-space and how drawing simple pictures can make you understand any pulse sequence including single shot (echo planar) imaging. Essentially covered twice since its the really coolest bit - how the gradient in MRI and a lens in optics do essentially the same thing.
8. MR hardware - magnets, system, rf coils, gradient coils, active screening.
9. Signal to noise in MRI and how it places real limits on what we can do.
10. Pieces:- chemical shift, resolution limit, bandwidth, acoustic screening, localized spectroscopy on humans.