

M219: Introduction to Magnetic Resonance Imaging (MRI)

Winter 2023

Lectures: Mon/Wed 2pm – 3:50pm

BH-173, CHS, Bauer Auditorium

Instructors:

Kyung Sung: 310-267-6842, ksung@mednet.ucla.edu

Holden Wu (Guest Lecturer)

Albert Thomas (Guest Lecturer)

Learning Objectives:

To introduce the students to the fundamental principles of magnetic resonance imaging.

To demonstrate basic applications of MRI.

Grading Structure:

There will be 3 homework assignments and a final exam.

- Homework: 60%
- Class Participation: 10%
- Final Exam: 30%

Course Schedule:

Lecture	Date	Topic
#1	Jan 9, 2023	Introduction
#2	Jan 11, 2023	MRI Systems I: B0 and Bulk Magnetization
#3	Jan 16, 2023	MLK Holiday
Homework #1 out		
#4	Jan 18, 2023	MRI Systems II: Nuclear Precession and B1
#5	Jan 23, 2023	Bloch Equations and Relaxation
#6	Jan 25, 2023	MRI Systems III: Gradients
#7	Jan 30, 2023	Imaging Principles I
Homework #1 due, Homework #2 out		
#8	Feb 1, 2023	Imaging Principles II
#9	Feb 6, 2023	Spatial Localization I
#10	Feb 8, 2023	Spatial Localization II
#11	Feb 13, 2023	MRI Signal Equation and Basic Image Reconstruction (by Holden Wu)
#12	Feb 15, 2023	Fast Imaging and Advanced Image Reconstruction (by Holden Wu)
Homework #2 due, Homework #3 out		
#13	Feb 20, 2023	Presidents' Day Holiday
#14	Feb 22, 2023	Basic Pulse Sequences I: Saturation Recovery and Inversion Recovery
#15	Feb 27, 2023	Basic Pulse Sequences II: Gradient Echoes
#16	Mar 1, 2023	Basic Pulse Sequences III: Spin Echoes
#17	Mar 6, 2023	Basics of MR Spectroscopy (by Dr. Albert Thomas)
#18	Mar 8, 2023	Fast MR Spectroscopic Imaging (by Dr. Albert Thomas)
Homework #3 due		
#19	Mar 13, 2023	TBD (by Dr. Jason Chiang)
#20	Mar 15, 2023	Vascular MRI (by Dr. Zhaoyang Fan from USC)
Mar 20-24		Final Exam