

M219: Introduction to Magnetic Resonance Imaging (MRI)

Winter 2024

Lectures: Mon/Wed 2pm – 3:50pm
BH-173, CHS, Bauer Auditorium

Instructors:

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

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 8, 2024 | Introduction |
| #2 | Jan 10, 2024 | MRI Systems I: B0 and Bulk Magnetization |
| #3 | Jan 15, 2024 | MLK Holiday |
| Homework #1 out | | |
| #4 | Jan 17, 2024 | MRI Systems II: Nuclear Precession and B1 |
| #5 | Jan 22, 2024 | Bloch Equations and Relaxation I |
| #6 | Jan 24, 2024 | Bloch Equations and Relaxation II |
| #7 | Jan 29, 2024 | MRI Systems III: Gradients |
| Homework #1 due, Homework #2 out | | |
| #8 | Jan 31, 2024 | Imaging Principles |
| #9 | Feb 5, 2024 | Spatial Localization I |
| #10 | Feb 7, 2024 | Spatial Localization II |
| #11 | Feb 12, 2024 | MRI Signal Equation and Basic Image Reconstruction (by Dr. Wu) |
| #12 | Feb 14, 2024 | Fast Imaging and Advanced Image Reconstruction (by Dr. Wu) |
| Homework #2 due, Homework #3 out | | |
| #13 | Feb 19, 2024 | Presidents' Day Holiday |
| #14 | Feb 21, 2024 | Spatial Localization and Imaging Sequences |
| #15 | Feb 26, 2024 | Imaging Sequences II |
| #16 | Feb 28, 2024 | Imaging Sequences III |
| #17 | Mar 4, 2024 | Basics of MR Spectroscopy (by Dr. Thomas) |
| #18 | Mar 6, 2024 | Fast MR Spectroscopic Imaging (by Dr. Thomas) |
| Homework #3 due | | |
| #19 | Mar 11, 2024 | Basics of MRI Strain Imaging (by Dr. Zhong) |
| #20 | Mar 13, 2024 | Basics of Quantitative MRI (by Dr. Christodoulou) |
| Mar 18-22 | | Final Exam |