

RAD 384-4
Magnetic Resonance Imaging Technology

INSTRUCTOR: Michael Grey, Ph.D., RT(R)(MR)(CT)
Associate Professor
Radiologic Sciences

ASA Rm #134
Phone: (618) 453-7203 or 453-7211
FAX: (618) 453-7020
E-Mail: mgrey@siu.edu

COURSE DESCRIPTION:

This course will focus on the technology of magnetic resonance imaging. It will include its physical principles, instrumentation, imaging techniques, contrast agents, patient care/safety precautions, quality assurance, and imaging applications for the head, spine, chest, abdomen, pelvis, and musculoskeletal (joints). In addition, a review of future applications of magnetic resonance imaging will be discussed. Prerequisite: RAD 362 or consent of instructor.

TEXTBOOK:

Suggested:

Westbrook, C. & Roth, C. R. & Talbot, J. (2011). *MRI in practice* (4th ed.). Malden, MA: Blackwell Science, Inc.

Additional:

Aichner, F. T., Felber, S. R., Muller, R. N., & Rinck, P. A. (1994). *Three-dimensional magnetic resonance imaging*. Boston, MA: Blackwell Scientific Publications.

Edelman, R. R., Hesselink, J. R., & Zlatkin, M. B. (1996). *Clinical magnetic resonance imaging* (2nd ed.). Philadelphia: W. B. Saunders Company.

Higgins, C. B., Hricak, H., & Holms, C. A. (1992). *Magnetic resonance imaging of the body* (2nd ed.). New York: Raven Press.

Lee, K. T., Sagel, S. S., Stanley, R. J., & Heiken, J. P. (Eds.). (1998). *Computed body tomography with MRI correlation* (3rd ed., Vols. 1-2). Philadelphia: Lippincott-Raven Publishers.

Lufkin, R. B. (1999). *Interventional MRI*. St. Louis: Mosby, Inc.

Resnick, D., & Kang, H. S. (1997). *Internal derangement of joints: Emphasis on MR imaging*. Philadelphia: W. B. Saunders Company.

Runge, V. M. (1990). *Clinical magnetic resonance imaging*. Philadelphia: J. B. Lippincott Company.

Stark, D. D., & Bradley, W. G. (1999). *Magnetic resonance imaging* (3rd ed., Vols. 1-3). St. Louis: Mosby Year Book.

Yucel, E. K. (1995). *Magnetic resonance angiography: A practical approach*. St. Louis: McGraw-Hill.

Note: These books are located in the Reserve Area of the Undergraduate Library.

WEB Sites:

<http://www.users.on.net/~vision/>

<http://123mri-today.4t.com>

<http://www.mrisafety.com>

http://www.acr.org/publications/active/mr_gloss.pdf

<http://www.mr-tip.com>

<http://www.medicinenet.com>

COURSE OBJECTIVES:

Upon completion of this course, the student will be able to:

1. Explain the physical principles of MRI.
2. List and explain the hardware components (instrumentation) of the MRI system.
3. Describe the process of signal encoding and image formation.
4. List and explain the design and application of MR imaging pulse sequences.
5. List and explain imaging parameters used in MRI.
6. List and describe the use of contrast agents in MRI.
7. Discuss flow phenomena and imaging.
8. Describe patient care/safety procedures.
9. List and explain common artifacts associated with MRI.
10. List and explain tests used to evaluate quality assurance in MRI.
11. Describe basic imaging applications for the head, spine, chest, abdomen, pelvis and musculoskeletal (joints).

GRADING SCALE:

The grading will be on a straight scale. Course grades will be based on article reviews, quizzes, tests and a final exam.

EVALUATION AND POINT VALUE FOR THE COURSE:

	Maximum Points	Your Points
Article Reviews (3)	30	_____
Quizzes (9)	80	_____
Tests (2) 50 points each	100	_____
Final Exam	<u>100</u>	_____
Total:	310	_____

A = 93 - 100%	288 - 310 points
B = 85 - 92%	263 - 289 points
C = 77 - 84%	239 - 262 points
D = 70 - 76%	217 - 238 points
F = Below 70%	below 216 points

Article Review Topics

1. Hardware
2. Pulse Sequences
3. Contrast Agents
4. MRA
5. Pt. Care & Safety
6. Artifacts
7. Quality Assurance

All students are expected to attend class and come prepared to discuss the topic assigned for that day. Tests will cover text, lecture, reading assignments, and handouts. No make-up tests will be given except for instructor approved absences.