

Washtenaw Community College Comprehensive Report

MRI 101 MRI Safety Effective Term: Fall 2015

Course Cover

Division: Math, Science and Health

Department: Allied Health

Discipline: Magnetic Resonance Imaging

Course Number: 101

Org Number: 15600

Full Course Title: MRI Safety

Transcript Title: MRI Safety

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: New Course

Change Information:

Rationale: This is a required course for the Magnetic Resonance Imaging (MRI) curriculum.

Proposed Start Semester: Fall 2015

Course Description: In this course, students are introduced to the principles of Magnetic Resonance Imaging (MRI) safety for the patient as well as occupational and ancillary personnel. The potential hazards and biological effects associated with the MRI environment and MRI procedures will also be discussed. Topics include magnetism, properties of magnetism, MR system components, MR magnets, radio frequency (RF) systems, gradient systems, system shielding, patient screening, contrast agents, and safety zones.

Course Credit Hours

Variable hours: No

Credits: 2

Lecture Hours: Instructor: 30 **Student:** 30

Lab: Instructor: 0 **Student:** 0

Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 30 **Student:** 30

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Requisites

Enrollment Restrictions

Admission to Magnetic Resonance Imaging (MRI) program.

Corequisite

MRI 125

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Identify the MRI safety protocols for patients, personnel, Magnetic Resonance (MR) zones, implants and other devices used in the Magnetic Resonance Imaging (MRI) environment.

Assessment 1

Assessment Tool: Departmental final exam

Assessment Date: Fall 2018

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: answer key

Standard of success to be used for this assessment: 80% of the students will score 70% or higher on each related outcome question.

Who will score and analyze the data: Departmental Faculty

2. Identify the potential hazards and biological effects associated with the Magnetic Resonance Imaging (MRI) environment and MRI procedures.

Assessment 1

Assessment Tool: Departmental final exam

Assessment Date: Fall 2018

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: answer key

Standard of success to be used for this assessment: 80% of the students will score 70% or higher on each related outcome question.

Who will score and analyze the data: Departmental Faculty

Course Objectives

1. Identify the basic properties of magnetism.
Matched Outcomes
2. Define gauss (g), tesla (T) and the electromagnetic spectrum.
Matched Outcomes
3. Describe the three basic types of magnets and give the advantages and disadvantages of each.
Matched Outcomes
4. Discuss the differences in low-, mid-, high- and ultra-high field systems.
Matched Outcomes
5. Explain the functionality of the radio frequency system in Magnetic Resonance (MR) imaging.
Matched Outcomes
6. Explain the functionality of the gradient system in Magnetic Resonance (MR) imaging.
Matched Outcomes
7. Explain the functionality of the shim system in Magnetic Resonance (MR) imaging.
Matched Outcomes
8. Explain the functionality of the ancillary equipment in Magnetic Resonance (MR) imaging.
Matched Outcomes
9. Discuss the elements of safety management that ensure a Magnetic Resonance (MR) facility operates safely.
Matched Outcomes
10. Describe the purpose and the general elements that make up a Magnetic Field Safety Program.
Matched Outcomes
11. Explain the protocols for proper screening and preparation of patients for Magnetic Resonance Imaging (MRI) procedures.
Matched Outcomes

12. List screening questions asked of patients before they can enter the Magnetic Resonance Imaging (MRI) scan room.
Matched Outcomes
13. Identify the type of radiation used in Magnetic Resonance (MR) imaging.
Matched Outcomes
14. Explain what happens when RF (radio frequency) is pulsed into the body.
Matched Outcomes
15. List the effects of RF (radio frequency) exposure in terms of human responses.
Matched Outcomes
16. Discuss the investigations and findings on the effects of static and transient magnetic fields on the human body.
Matched Outcomes
17. Identify potential hazards in the Magnetic Resonance (MR) environment.
Matched Outcomes
18. Describe when and how to quench the magnet and handle other emergencies in the MR environment.
Matched Outcomes
19. Describe and compare the safety concerns associated with both the external and internal (to the magnet) areas of the magnetic field.
Matched Outcomes
20. Explain why ferromagnetic objects that might be in a patient's body are potential sources of injury.
Matched Outcomes
21. List and briefly describe the types of medically implanted metal objects that might be found in a patient's body and can be a potential hazard when the patient is placed in a magnetic field.
Matched Outcomes
22. List and briefly describe the types of accidentally imbedded metal objects that might be found in a patient's body and can be a potential hazard when the patient is placed in a magnetic field.
Matched Outcomes
23. Describe the procedure for determining if a specific medical device, such as a surgical clip, is a potential hazard when the patient is placed in a magnetic field.
Matched Outcomes
24. Describe completely the procedures to be followed to prevent hazardous metal objects to be brought into the magnetic field area.
Matched Outcomes
25. Identify the conditions that can produce skin burns during an MRI acquisition and describe the steps to take to prevent them.
Matched Outcomes

New Resources for Course

Course Textbooks/Resources

Textbooks

Shellock, F. *Reference Manual for Magnetic Resonance, Safety, Implants, and Devices.*, ed. Los Angeles:Biomedical Research Publishing Group, 2014

Bushong, Stewart. *Magnetic Resonance Imaging Physical and Biological Principles*, 3 ed. Elsevier Health Sciences, 2003, ISBN: 9780323014854.

Westbrook, C. & Roth, C. & Talbot, J. . *MRI In Practice* , 4 ed. Wiley, 2011, ISBN: 9781444337433.

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Testing Center

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Connie Foster</i>	<i>Faculty Preparer</i>	<i>Nov 18, 2014</i>
Department Chair/Area Director: <i>Connie Foster</i>	<i>Recommend Approval</i>	<i>Nov 18, 2014</i>
Dean: <i>Kristin Brandemuehl</i>	<i>Recommend Approval</i>	<i>Nov 19, 2014</i>
Vice President for Instruction: <i>Bill Abernethy</i>	<i>Approve</i>	<i>Jan 05, 2015</i>