

Washtenaw Community College Comprehensive Report

MRI 162 MRI Pulsed Sequence, Imaging Options, and Parameters Effective Term: Fall 2015

Course Cover

Division: Math, Science and Health

Department: Allied Health

Discipline: Magnetic Resonance Imaging

Course Number: 162

Org Number: 15600

Full Course Title: MRI Pulsed Sequence, Imaging Options, and Parameters

Transcript Title: MRI Pulse Sequence

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) Program

Proposed Start Semester: Spring/Summer 2016

Course Description: In this course, students learn the parameters and imaging options necessary to create quality magnetic resonance (MR) images. Topics include magnetic resonance (MR) pulse sequences, image formation, and image contrast. The pulse sequences covered are spin echo, fast spin echo, gradient echo, inversion recovery, echo planar, parallel imaging, and spectroscopy. Tissue characteristics, contrast agents, and post-processing techniques are also covered.

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 the Magnetic Resonance Imaging (MRI) program

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Identify the pulse sequences commonly used in Magnetic Resonance Imaging (MRI).

Assessment 1

Assessment Tool: Departmental final exam

Assessment Date: Spring/Summer 2019

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. Recognize the Magnetic Resonance Imaging (MRI) parameters involved in MR image formation.

Assessment 1

Assessment Tool: Departmental final exam

Assessment Date: Spring/Summer 2019

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

3. Identify imaging options used to obtain diagnostic magnetic resonance (MR) images.

Assessment 1

Assessment Tool: Departmental final exam

Assessment Date: Spring/Summer 2019

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. List and explain the design and application of Magnetic Resonance Imaging (MRI) pulse sequences.

Matched Outcomes

2. List and describe the use of contrast agents in Magnetic Resonance Imaging (MRI).

Matched Outcomes

3. Analyze the effects imaging parameters have on magnetic resonance (MR) signal and contrast.

Matched Outcomes

4. Explain what is meant by a weighted magnetic resonance (MR) image.

Matched Outcomes

5. Describe image contrast appearance according to image weighting.

Matched Outcomes

6. Name the basic tissue magnetic characteristics that are the sources of contrast in magnetic resonance images.

Matched Outcomes

7. Recognize image artifacts, their cause and how to avoid them.

Matched Outcomes

8. Differentiate between spin echo and inversion recovery.

Matched Outcomes

9. Explain how the EPI sequence differs from other sequences.
Matched Outcomes
10. Discuss rapid imaging techniques.
Matched Outcomes
11. List imaging parameters and explain how they influence the appearance of the magnetic resonance (MR) image.
Matched Outcomes
12. List parameters related to tissue characteristics that affect image contrast.
Matched Outcomes
13. Explain how repetition time, echo time, inversion time and flip angle affect image production.
Matched Outcomes
14. Describe how imaging parameters determine spatial resolution on magnetic resonance (MR) images.
Matched Outcomes
15. Discuss the basic physical principles of Magnetic Resonance Spectroscopy (MRS).
Matched Outcomes
16. Identify the major imaging issues that must be considered when selecting or adjusting an imaging protocol for a specific clinical procedure.
Matched Outcomes
17. Explain and illustrate how to change TR (repetition time).
Matched Outcomes
18. Explain and illustrate how to change TE (echo time).
Matched Outcomes
19. Explain the use of gradient and radiofrequency (RF) pulses in acquiring MR images.
Matched Outcomes
20. Explain the operation of inversion recovery and gradient echo pulse sequences.
Matched Outcomes

New Resources for Course

No new resources are required for this course.

Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom
Other: OE 121 Radiography Lab

<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>