

Washtenaw Community College Comprehensive Report

MRI 110 MRI Physics I Effective Term: Fall 2022

Course Cover

College: Health Sciences

Division: Health Sciences

Department: Allied Health

Discipline: Magnetic Resonance Imaging

Course Number: 110

Org Number: 15600

Full Course Title: MRI Physics I

Transcript Title: MRI Physics I

Is Consultation with other department(s) required: No

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

Reason for Submission: Three Year Review / Assessment Report

Change Information:

Consultation with all departments affected by this course is required.

Course description

Outcomes/Assessment

Objectives/Evaluation

Rationale: Update syllabus to meet requirements for updated program.

Proposed Start Semester: Fall 2022

Course Description: In this course, students will be introduced to the physical principles of Magnetic Resonance Imaging (MRI), including the basic physics of MRI. Topics include magnetism, MRI signal production, image contrast, spin echo and gradient echo pulse sequences and an introduction to pulse sequence diagrams.

Course Credit Hours

Variable hours: No

Credits: 3

Lecture Hours: Instructor: 45 **Student:** 45

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

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

Total Contact Hours: Instructor: 45 **Student:** 45

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

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Identify and apply the principles of pulse sequences, parameters and pulse diagrams.

Assessment 1

Assessment Tool: Outcome-related questions on the department final exam

Assessment Date: Fall 2023

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: 70% of the students will score 70% or higher on the outcome-related questions.

Who will score and analyze the data: Departmental faculty

2. Identify differences between spin echo and gradient pulse sequences.

Assessment 1

Assessment Tool: Outcome-related questions on the department final exam

Assessment Date: Fall 2023

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: 70% of the students will score 70% or higher on the outcome-related questions.

Who will score and analyze the data: Departmental faculty

Course Objectives

1. Describe the nature of the electric field.
2. Describe the nature of magnetism.
3. Explain the role of electromagnetism in Magnetic Resonance Imaging (MRI).
4. Explain the significance of hydrogen in MRI.
5. Describe the process of MRI image formation.
6. Differentiate between ferrous and non-ferrous materials.
7. Define magnetic susceptibility.
8. Explain magnetic moments.
9. Discuss the effect of external magnetic field.
10. Explain the significance of Radio Frequency (RF) pulse.
11. Define resonance and Larmor frequency.
12. Define free induction decay (FID).
13. Describe the origin of the T1 and T2 relaxation mechanisms.
14. Identify the fundamentals of MRI image production.
15. Identify basic components on a pulse sequence diagram.

New Resources for Course

Course Textbooks/Resources

Textbooks

Westbrook, C and Talbot, J. *MRI in Practice*, 5 ed. Wiley-Blackwell, 2018, ISBN: 9781119391968.

Manuals
Periodicals
Software

Equipment/Facilities

Testing Center
Other: Virtual Classroom

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Catherine Blaesing</i>	<i>Faculty Preparer</i>	<i>Oct 25, 2021</i>
Department Chair/Area Director: <i>Kristina Sprague</i>	<i>Recommend Approval</i>	<i>Oct 27, 2021</i>
Dean: <i>Eva Samulski</i>	<i>Recommend Approval</i>	<i>Nov 03, 2021</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Feb 22, 2022</i>
Assessment Committee Chair: <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Feb 23, 2022</i>
Vice President for Instruction: <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Feb 23, 2022</i>