Washtenaw Community College Comprehensive Report

MRI 110 MRI Physics I
Effective Term: Fall 2015

Course Cover

Division: Math, Science and Health
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: 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 physical principles of Magnetic Resonance Imaging (MRI), including the basic physics of MRI. Topics include magnetism, MRI signal production, image contrast, spatial localization including k-space filling, 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: Department 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 the outcome related questions.
Who will score and analyze the data: Departmental Faculty

2. Identify and apply the principles of spatial locational and k-space filling.
Assessment 1
Assessment Tool: Department 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 the outcome related questions.
Who will score and analyze the data: Departmental Faculty

Course Objectives

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

New Resources for Course

Course Textbooks/Resources

Textbooks

Roth, Carolyn. *Volume 1 Basic & Advanced Principles of MRI: MRI Review Program for Technologists*, ed. Imaging Education Associates & Bracco Diagnostics, Inc, 2001, ISBN: 9780971225008.

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

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Testing Center

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