Washtenaw Community College Comprehensive Report

MRI 140 MRI Procedures II
Effective Term: Fall 2022

Course Cover

College: Health Sciences
Division: Health Sciences
Department: Allied Health
Discipline: Magnetic Resonance Imaging
Course Number: 140
Org Number: 15600
Full Course Title: MRI Procedures II
Transcript Title: MRI Procedures II
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Course Change
Change Information:
Consultation with all departments affected by this course is required.
Course description
Pre-requisite, co-requisite, or enrollment restrictions
Outcomes/Assessment
Objectives/Evaluation
Rationale: This is a second semester course. Changes are being made to this course to include information from the current 3rd semester. The 3rd semester is being eliminated.
Proposed Start Semester: Winter 2023
Course Description: In this course, students learn the Magnetic Resonance Imaging (MRI) scanning procedures for the chest, abdomen, pelvis as well as advanced imaging procedures. Magnetic Resonance (MR) topics include scanning pulse sequences, positioning and patient care, sectional anatomy, and pathology. Anatomical structures and the plane that best demonstrates anatomy will be discussed as well as signal characteristics of normal and abnormal structures. Additional topics include breast MRI including dynamic contrast enhanced MR of the breast, cardiac MR including myocardial perfusion and cardiac stress MR, function and functional MR, MR enterography (MRE), colonography, molecular MR imaging and MR elastography.

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

Prerequisite minimum grade "C"
MRI 120 Procedures I
Enrollment Restrictions
Admission to Magnetic Resonance Imaging (MRI) Program
Corequisite
MRI 146

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. List the pulse sequences most commonly used for MRI scanning of the chest, abdomen and pelvis.
   Assessment 1
   Assessment Tool: Outcome-related questions on the departmental final exam
   Assessment Date: Winter 2024
   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. Recognize normal and abnormal anatomy on MR images of the chest, abdomen and pelvis.
   Assessment 1
   Assessment Tool: Outcome-related questions on the departmental final exam
   Assessment Date: Winter 2024
   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

3. Determine the best coil selection, scan planes, and imaging options for MRI procedures of the chest, abdomen and pelvis.
   Assessment 1
   Assessment Tool: Outcome-related questions on the departmental final exam
   Assessment Date: Winter 2024
   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

4. Differentiate the protocols for the advanced MRI scanning procedures.

Assessment 1

Assessment Tool: Outcome-related questions on the departmental final exam
Assessment Date: Winter 2024
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. Explain the role of MRI in the detecting and staging of hepatic carcinomas.
2. Explain the role of MRI in the detecting and follow-up of pancreatic ductal carcinoma.
3. Determine timing for arterial and venous phases used for dynamic contrast enhanced imaging in the chest, abdomen, and pelvis.
4. Explain the role of MR enterography in the detecting and staging of small and large bowel pathologic processes.
5. Explain MRI imaging of kidney pathology and function.
6. Discuss patient care issues and preparations for imaging of the chest, abdomen and pelvis.
7. Identify imaging planes and protocols employed for imaging in the chest, abdomen and pelvis.
8. Explain the role of MRI in the detection of vessels supplying uterine fibroids.
9. Explain the role of MRI in the detection of uterine and cervical congenital abnormalities.
10. Explain the role of MRI in the detection of pelvic pathologies including prostate cancer, endometriosis and adnexal cancers.
11. Explain the imaging practices for the aorta, inferior vena cava (IVC) and great vessels.
12. Use clinically acquired images as a basis for the discussion of pathology, anatomy, pulse sequences and parameters for MR chest, abdomen and pelvic imaging.
13. Determine when to use respiratory gating, respiratory compensation, breath hold techniques in MR chest and abdomen imaging.
14. Explain how to properly use both cardiac and peripheral gating when imaging in the mediastinum.
15. Determine normal cardiac anatomy including 2, 3, and 4 chamber views, left ventricular outflow tract, right ventricular outflow tract, and short axis images
16. Recognize normal and abnormal anatomy on MRI imaging of the myocardium, including scars and tumors.
17. Describe how a breast MR is performed including dynamic breast imaging and MR breast biopsy.
18. Explain molecular imaging and the difference between perfusion and arterial spin labeling.
19. Explain the patient preparation and scanning procedure used for both magnetic resonance enterography (MRE).
20. Explain the concepts related to magnetic resonance MRE including why, and how it is used in the clinical setting. Discuss the concepts behind MRE as it relates to liver imaging for cirrhosis and the new application in brain imaging.
21. Discuss the role of MRI in the detection of cardiac insult, tumor and determination of cardiac viability.
22. Specify the scan slice placement used to produce images of the chambers, outflow tracts, pulmonary vessels, great vessels, and valves of the heart.
23. Discuss the role of MRI in detecting breast cancers for BRCA1 and BRCA2 positive patients. Explain uptake and washout curves and the role of computer-aided detection of breast cancers.
24. Discuss functional MR with activation maps and identify the various functional areas of the brain.
25. Explain MR spectography and Hunter’s angle.

New Resources for Course

Course Textbooks/Resources

Textbooks

Burghart, Geraldine and Finn, Carol. *Handbook of MRI Scanning*, 1st ed. St. Louis: Elsevier, 2011, ISBN: 978032306818.

Grey, Michael L. and Ailinani, Jagan M. *CT and MRI: Pathology: A Pocket Atlas*, 3rd ed. New York: McGraw-Hill Education, 2018, ISBN: 97812601219.

Bright, Anne. *Planning and Positioning in MRI*, 1st ed. Chatswood: Elsevier, 2011, ISBN: 97807295398.

Manuals

Periodicals

Software

Equipment/Facilities

Testing Center

Other: Virtual classroom

Reviewer	Action	Date
Faculty Preparer:		
Catherine Blaesing	*Faculty Preparer*	*Jan 16, 2022*
Department Chair/Area Director:		
Kristina Sprague	*Recommend Approval*	*Jan 19, 2022*
Dean:		
Shari Lambert	*Recommend Approval*	*Jan 28, 2022*
Curriculum Committee Chair:		
Randy Van Wagnen	*Recommend Approval*	*Mar 15, 2022*
Assessment Committee Chair:		
Shawn Deron	*Recommend Approval*	*Mar 16, 2022*
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Mar 22, 2022*

Washtenaw Community College Comprehensive Report

MRI 140 MRI Procedures II
Effective Term: Fall 2015

Course Cover

Division: Math, Science and Health
Department: Allied Health
Discipline: Magnetic Resonance Imaging
Course Number: 140
Org Number: 15600
Full Course Title: MRI Procedures II
Transcript Title: MRI Procedures II
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: Winter 2016
Course Description: In this course, students learn the Magnetic Resonance Imaging (MRI) scanning procedures for the chest, abdomen, and pelvis. Topics include scanning pulse sequences, positioning and patient care, sectional anatomy, and pathology. Anatomical structures and the plane that best demonstrates anatomy will be discussed as well as signal characteristics of normal and abnormal structures.

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

Prerequisite minimum grade "C"
MRI 120 Procedures I
Enrollment Restrictions
Admission to the Magnetic Resonance Imaging (MRI) Program
Corequisite
MRI 145

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. List the pulse sequences most commonly used for MRI scanning of the chest, abdomen and pelvis.
   Assessment 1
   Assessment Tool: Department final exam
   Assessment Date: Winter 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 the outcome related questions.
   Who will score and analyze the data: Departmental Faculty

2. Recognize normal and abnormal anatomy on magnetic resonance (MR) images of the chest, abdomen and pelvis.
   Assessment 1
   Assessment Tool: Department final exam
   Assessment Date: Winter 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 the outcome related questions.
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3. Determine the best coil selection, scan planes, and imaging options for Magnetic Resonance Imaging (MRI) procedures of the chest, abdomen and pelvis.
   Assessment 1
   Assessment Tool: Department final exam
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   Assessment Cycle: Every Three Years
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Course Objectives

1. Explain the role of MRI in detecting and staging of hepatic carcinomas.
   Matched Outcomes
2. Explain the role of MRI in detecting and follow up of pancreatic ductal carcinoma.
   Matched Outcomes
3. Determine timing for arterial and venous phases used for dynamic contrast enhanced imaging in the chest, abdomen, and pelvis.
   Matched Outcomes
4. Explain the role of MR enterography in detecting and staging of small and large bowel pathologic processes.
   Matched Outcomes
5. Explain MRI imaging of kidney pathology and function.
   Matched Outcomes
6. Discuss patient care issues and preparations for imaging of the chest, abdomen and pelvis.

Matched Outcomes

7. Identify imaging planes and protocols employed for imaging in the chest, abdomen and pelvis.
   Matched Outcomes
8. Explain the role of MRI in the detection of vessels supplying uterine fibroids.
   Matched Outcomes
9. Explain the role of MRI in the detection of uterine and cervical congenital abnormalities.
   Matched Outcomes
10. Explain the role of MRI in the detection of pelvic pathologies including prostate cancer, endometriosis and adnexal cancers.
    Matched Outcomes
11. Explain the imaging practices for the aorta, IVC and great vessels.
    Matched Outcomes
12. Use clinically acquired images as a basis for discussion of pathology, anatomy, pulse sequences and parameters for MR chest, abdomen and pelvic imaging.
    Matched Outcomes
13. Determine when to use respiratory gating, respiratory compensation, breath hold techniques in MR chest and abdomen imaging.
    Matched Outcomes
14. Explain how to properly use both cardiac and peripheral gating when imaging in the mediastinum.
    Matched Outcomes

New Resources for Course

Course Textbooks/Resources

Textbooks
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*