



**Course Syllabus
SEMESTER
School of Nursing and Health Professions
MRI Department**

<i>Course Name:</i>	MRI Physics I
<i>Course & Section Number:</i>	MRI 103-XXX
<i>Meeting Day(s) & Time(s):</i>	
<i>Credits:</i>	3
<i>Contact Hours:</i>	3
<i>Instructor's Name:</i>	
<i>Office Hours & Location:</i>	
<i>OCC Phone:</i>	
<i>OCC Email:**</i>	
<i>Additional Contact Information:</i>	

*Please call me (name); it is my preferred name. If you have a preferred name, please let me know so that I can use it.

**Please use only Owens email for course communications.

Catalog description:

Foundational concepts of the physical principles of magnetic resonance imaging are presented. MR imaging parameters, sequence selections and imaging options are covered.

Prerequisite/Corequisites:

Co-requisites: MRI 104

Prerequisites: MRI 100 with a 'C' or better

Course Materials:

Westbrook, C., & Talbot, J. (2019). *MRI in practice*. Hoboken, NJ: Wiley, Blackwell.

*If a **print book, e-book, or access code** is required for class, you can access the Owens Community College e-Campus Bookstore by accessing the online link, called “Find Books” on the course schedule for each course section. See the example below.*

OER and Owens Community College Library Resources (Open Educational Resources are free online materials for instructor and student use. Some OER material may be available in print in the Owens Community College Library.)

What You Will Learn in the Course

Course Objectives:

Course will:

1. Review the historical development of magnetic resonance imaging.
2. Introduce the fundamental principles of physics related to MRI.
3. Present information on the components, function and use of MR imaging equipment to perform diagnostic procedures.

Student Learning Outcomes:

Students will:

	Outcome	Where Assessed
1	Identify the components and describe the function of each utilized in MR image production.	Quizzes, Tests, Exams
2	Explain the theory and physical principles of MR imaging.	Homework, Quizzes, Tests, Exams
3	Define and explain the terminology related MR physics.	Homework, Quizzes, Tests, Exams
4	Demonstrate the ability to apply the mathematical principles utilized in MR physics.	Quizzes, Tests, Exams

Institutional General Education Competencies:

As a student at Owens Community College, you will take General Education courses as part of your degree program. While specific to the General Education courses, will be reinforced in many of your degree program major courses and may be measured in your capstone course(s) and others as identified.

Technology, Lab, and File Requirements:

Microsoft Office 365

<https://www.owens.edu/office365/>

Respondus

<https://download.respondus.com/lockdown/download.php?id=139313370>

Academic Support

Disability Services Resource Center: If you have a disability or acquire one, you may be entitled to receive reasonable accommodations intended to assure you an equal opportunity to participate in and benefit from the program. To receive more information or to register for accommodations, please contact the Disability Resource Center at 567-661-7007, email disability@owens.edu, visit <https://www.owens.edu/disability/>, or stop by College Hall 116.

Tutoring Services: Owens Community College offers academic tutoring and assistance in a variety of subjects including: accounting, computing, economics, mathematics, science, and writing. For more information go to: <https://www.owens.edu/successcenters/>.

Counseling Services: Counseling Services provides assistance to students experiencing personal, educational, interpersonal/relationship, family, social, or psychological difficulties. If you feel you may benefit from this service, please contact them at counselingservices@owens.edu. More information is at <https://www.owens.edu/counseling/>.

Campus and Community Connections: The Center for Campus and Community Connections (College Hall 123) is a walk-in office created to provide retention support through resource stability initiatives and community connections. Go here for more information: <https://www.owens.edu/connection/> or contact connections@owens.edu

Owens Library: The Owens Library offers two locations (Toledo and Findlay) as well as online resources. For more information visit <https://www.owens.edu/library/>.

Students can find more information on campus resources, student support, student life, and security at this [link](#).

General Information

Student Code of Conduct: All students are expected to follow Owens Community College's Student Code of Conduct, which includes academic honesty, encompassing plagiarism. See the Board Policy for more information.

Anti-Discrimination and Harassment & Title IX/Sexual Misconduct: All students, faculty, and staff are expected to follow Owens Community College's Anti-Discrimination and Harassment Policy and the College's Title IX Policy/Sexual Misconduct Procedures and

Guidelines. The College strictly prohibits and will not tolerate harassment, discrimination, intimidation, or hostile/offensive working or learning environments.

Religious Accommodations: A student seeking an accommodation for an absence permitted under Ohio's Testing Your Faith Act must provide the instructor with a written email notice with the specific dates for an absence, and must do so not later than fourteen (14) days after the first day of instruction. Alternative accommodations are not retroactive, and no academic penalty will be imposed for an absence under the policy*. The request for an alternative accommodation will be kept confidential. Students with questions about a religious accommodation under Ohio's Testing your Faith Act may contact the College's Office of Academic Affairs: provost@owens.edu. The policy may be found on the Owens website: [3358:11-2-63 Accommodation for a Student Absence for the Observance of Religious Beliefs and Practices Policy](#)

Document Collection: Throughout the semester, your instructors may ask for a variety of assignments including tests and/or quizzes for student learning of institutional general education competencies or program assessment. Please save all your class materials until the end of the semester.

Classroom Admittance: OCC classes shall only be attended by the officially registered OCC students or perspective students, instructor of record, guest lecturer, or substitute. Visitors are not permitted to be in the classroom and should not be invited to attend or participate in the class. See [FERPA](#) regulations for more information.

Use of AI Tools: This course permits you to use artificial intelligence (AI) tools, such as chatbots, text generators, paraphrasers, summarizers, or solvers, to get guidance on assignments, as long as you do so in an ethical and responsible manner. Essentially, you can think of these tools as ways to help you learn but not to entirely create work for assignments like discussion board posts, essays, presentation slides, and so on. AI is more like your tutor or TA, not a replacement for your independent thinking.

This means that you must:

- Not use AI tools to replace your own thinking or analysis or to avoid engaging with the course content.
- Cite or explain any AI tools you use. Provide the name of the AI tool, the date of access, the URL of the interface, and the specific prompt or query you used to generate the output.
- Be transparent and honest about how you used the AI tool and how it contributed to your assignment. Explain what you learned from the AI tool, how you verified its accuracy and reliability, how you integrated its output with your own work, and how you acknowledged its limitations and biases.

You are accountable for any mistakes or errors made by the AI tool. Always check and edit the output before submitting your work. If you discover any inaccuracies or inconsistencies in the output after submission, notify the instructor immediately and correct them as soon as possible. Using AI tools in an unethical or irresponsible manner, such as copying or paraphrasing the output without citation or transparency, using the output as your own work without verification or integration, or using the output to misrepresent your knowledge or skills, is considered a form of academic dishonesty and will result in a zero grade for the assignment and possible

disciplinary action. If you have any questions about what constitutes ethical and responsible use of AI tools, please consult with the instructor **before** submitting your work.

NOTE: Some instructors will also list specific acceptable and unacceptable uses or include a statement like “All written assignments, projects, and exams must be completed independently.”

Student Responsibilities & Instructor Expectations

Students represent themselves, their program, and the department and are expected to maintain professionalism in attitude, behavior, and appearance. In lecture, lab, or clinical settings, students must:

- Arrive early, stay the full session, and notify faculty of absences at least 30 minutes in advance. Make-up work is at the instructor’s discretion.
- Come prepared with required materials and complete readings.
- Submit all assignments on time; late work may not be accepted or may be penalized.
- Show respect and courtesy to peers, faculty, patients, and visitors.
- Listen attentively and support others’ contributions.
- Seek feedback from instructors and MRI professionals.
- Address concerns promptly by speaking directly with faculty or appropriate individuals.

Instructor Expectations:

The instructor is committed to providing a structured, respectful, and engaging learning environment that supports student success. Students can expect the following:

- The instructor will be prepared for each class session with relevant content, materials, and activities aligned with course objectives.
- The instructor will respond to student emails and inquiries within 24–48 hours on weekdays and will communicate clearly regarding assignments, deadlines, and expectations.
- Timely, constructive feedback will be provided on assignments and assessments to support student learning and improvement.
- The instructor will promote a respectful and inclusive classroom atmosphere where all students feel valued and supported.
- The instructor will be available during posted office hours and by appointment to offer additional academic support or clarification as needed.

Students are encouraged to engage fully in the course and uphold their responsibilities as active participants in the learning process.

How Grades and Determined and Major Assignments

Grading Procedure:

Grades will be calculated on the following scale.

93% and Above	A
85% to 92%	B
76% to 84%	C
60% to 75%	D
59% or Below	F

If the percentage earned is less than 76% for the course, the student will earn a grade of “**D or F**” for the course and be removed from the program.

The final course grade is to be computed using the following weights.

Evaluation Measure	Value	Student Learning Outcome Assessed
Quizzes (Lowest Score dropped)	12%	1,2,3,4
Homework as Assigned	18%	2,3
Tests	20%	1,2,3,4
Midterm Exam	20%	1,2,3,4
Comprehensive Final Exam	30%	1,2,3,4

Week	SLO	Reading	Topic	Due date
Week 1	1,2,3,4	Ch. 3 Ch. 4 Pgs. 89-127	Syllabus review Review – Spin Echo pulse sequences Gradient Echo Pulse Sequences, Weighting in GE, Coherent and Incoherent GE, Reverse Echo GE, Balanced GE, Fast GE, EPI	
Week 2	1,2,3,4	Ch. 4 Pgs. 89-127 Ch. 5	Gradient Echo Pulse Sequences, Weighting in GE, Coherent and Incoherent GE, Reverse Echo GE, Balanced GE, Fast GE, EPI Spatial Encoding, Mechanisms of gradients, Gradient Axes, Slice selection, Frequency Encoding, Phase Encoding	Quiz 1
Week 3	1,2,3	Ch. 5	Spatial Encoding, Mechanisms of gradients, Gradient Axes, Slice selection, Frequency Encoding, Phase Encoding Review	
Week 4	1,2,3,4		Test 1 Chapters 3,4 & 5	Test 1
Week 5	1,2,3	Ch. 6 Pgs 158-208	K-space	

			Data Collection and image formation, K space description, K space filling, FFT, Important facts about K space Sampling	
Week 6	1,2,3,4	Ch. 6 Pgs 158-208	Data Collection and image formation, K space description, K space filling, FFT, Important facts about K space Sampling	Quiz 2
Week 7	1,2,3,4	Chap 6 Pgs 158-208	Data Collection and image formation, K space description, K space filling, FFT, Important facts about K space Sampling Midterm Review	
Week 8	1,2,3,4		Midterm Ch 4-6	Midterm
Week 9	1,2,3,4	Chap 7 Pgs.209-241	Protocol Optimization Signal to Noise (SNR), Contrast to Noise (CNR) Spatial Resolution, Scan times, Trade Offs, Protocol Development Performance improvement initiatives, Quality assurance, ACR	
Week 10	2,3	Ch. 7	Trade-off's, protocol development, performance improvement initiatives, quality assurance, ACR	Quiz 3
Week 11	3,4	*Ch. 8 Pgs 242-280 & Table 8.8 on pp296-297	Artifacts Phase mismapping, Aliasing or wrap around, Chemical shift artefact, out of phase artefact, truncation artefact, magnetic susceptibility artefact, cross-excitation and cross-talk, zipper artefact, shading artefact, Moire artefact, magic angle Review parameter trade-offs	Quiz 4
Week 12	1,2,3	Ch. 7 & 8	Quiz over artifacts/remedies Review hmwk voxel/pixels/parameter trade-offs/artifacts	Quiz 5
Week 13	1,2,3,4			Test 2
Week 14				

Week 15	2,3	Online Documents	History of MRI Review for Final Exam	
Week 16	1,2,3,4		Final Exam	Final Exam

Disclaimer: The instructor reserves the right to amend this syllabus as deemed necessary and will communicate such amendment to the students in the course. Please note that while unlikely, there is a possibility courses might need to change the delivery method due to external issues like public health concerns, weather issues, etc. If this happens, the college will communicate any changes via email and/or other communication methods.