

Virginia Western Community College

RAD 115

MRI Physics and Instrumentation

Prerequisites:

RT, CNMT, ARRT Registered or Registry Eligible

Course Description:

This course is designed to introduce the student to Magnetic Resonance Imaging (MRI) basic principles through the exploration of the effects of magnetism, radio frequencies, image formation, reconstruction and data manipulation to achieve medically diagnostic images of the human body. Topics will include MR signal, relaxation, T1 recovery, T2 decay, image weighting and contrast, imaging parameters, pulse sequences, paramagnetic contrast agents, and vascular imaging. MRI Safety related to imaging.

Semester Credits: 3**Lecture Hours: 3****Lab/Clinical/Internship Hours: 0****Required Materials**

Course materials will be loaded on the learning management system

Other Required Materials:

Internet Access

Course Outcomes

At the completion of this course, the student should be able to:

- Discuss resonance and its importance in MRI
- Explain the generation of the MR signal and related topics
 - Larmor Frequency
 - Coherent transverse magnetization
 - Magnetic Moments
 - T1 recovery
 - T₂ relaxation
- Discuss image weighting and contrast as related to imaging anatomy
- Explain signal encoding and image formation
- Discuss imaging parameters and their tradeoffs.
- Identify various pulse sequences utilized in MR imaging and give the advantages or disadvantages of each pulse sequence.
- Recognize the significance of adhering to magnet safety protocols
- Employ current methods of screening patients for MRI Examinations
- Identify emergency procedures for quenching of magnet