MEDI 7057 MRI PHYSICS

Credit Points 10

Legacy Code 401323

Coordinator James Nol (https://directory.westernsydney.edu.au/search/name/James Nol/)

Description This subject provides the students with a detailed understanding of the design of the different Magnetic Resonance Imaging (MRI) Scanners. Differences in Electromagnets and Superconducting magnets; production of the magnetic field; radiofrequency (RF) energy; the physics behind pulse sequence absorption of RF Energy and MR Property of Protons are explored. This subject briefly explains their application and how they interrelate with essential accessories such as coils to form an image. The subject also explores the various forms of image contrast that can be obtained using MRI, along with various basic and intermediate MRI pulse sequences and image reconstruction techniques. Students will learn the factors that may cause artefact formation, image quality concerns, and an understanding of the noise producing factors. It also focuses on the safety requirements, and the serious consequences if proper safety procedures are not implemented and followed.

School Medicine

Discipline Radiology

Student Contribution Band HECS Band 3 10cp

Level Postgraduate Coursework Level 7 subject

Restrictions

Students must be enrolled in 4767 Master of Advanced Imaging (MRI), 4768 Graduate Diploma of Advanced Imaging (MRI) or 4769 Grad Certificate in Advanced Imaging (MRI)

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Critically analyse Magnetic Resonance Imaging (MRI) Physics, characteristics of the different equipment and the role of the accessories required to form an image.
2. Employ magnetic resonance imaging as the primary diagnostic tool for the production of safe, and reliable diagnostic images.
3. Explore maintenance requirement for the different MRI designs.
4. Explore the different design of magnetic resonance imaging that employs patient-friendly and safer technology.
5. Analyse safety measures to protect MRI equipment, patients and staff.

Subject Content

Magnetic Resonance (MR) Radiofrequency, Equipment Design and Safety.
1. Principles of Magnetic Resonance Imaging (MRI) Physics and basic electromagnetism.
2. Principle of MR image formation, from proton spin signal to final image requisition.
3. Different configurations and designs of MRI equipment.
4. Maintenance ? what parts require (or may require) regular maintenance.
5. Frequencies and methods of production of the magnetic field.
6. MRI Safety Guidelines.

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Reflection	500 words each (Reflective Journal x 8)	40	N	Individual
Applied Project	1500 words	40	N	Individual
Literature Review	1000 words	20	N	Individual

Teaching Periods

Spring (2022)

Online

Online

Subject Contact James Nol (https://directory.westernsydney.edu.au/search/name/James Nol/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MEDI7057_22-SPR_ON_O#subjects)

Spring (2023)

Online

Online

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View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MEDI7057_23-SPR_ON_2#subjects)