

MEDI 7049 ADVANCED MR THEORY

Credit Points 10

Legacy Code 401324

Coordinator James Nol ([https://directory.westernsydney.edu.au/search/name/James Nol/](https://directory.westernsydney.edu.au/search/name/James%20Nol/))

Description This subject provides students with a detailed understanding of "MR Accessories, Image Quality and Contrast Media" employed in Magnetic Resonance Imaging (MRI) technology and the relationship between magnet and coil, the utilisation of the different channels for image formation and pixilation, as well as exploring the role contrast media plays in enhancing body organs. Students will have an in-depth understanding of interactive effects of scanning parameters on the image quality and how to prevent the formation of artefacts and reduce Specific Absorption Rate to improve image quality, reduce artefact and reduce heat generation, and to prevent harm of burns to the patient.

School Medicine

Discipline Radiology

Student Contribution Band HECS Band 3 10cp

Check your fees via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Postgraduate Coursework Level 7 subject

Pre-requisite(s) MEDI 7057 MRI Physics

Restrictions

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

Learning Outcomes

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

1. Critically analyse the principles of Nuclear Magnetic Resonance and the process of Magnetic Resonance Imaging (MRI) signal acquisition
2. Apply MRI physics in clinical practice
3. Examine MRI parameters, image contrast and image formation
4. Evaluate pulse sequences and their applications to better respond to clinical indications
5. Optimise image resolution, Signal to Noise Ratio and scan time, to produce high-quality diagnostic images
6. Explore the origin of image artefact, measures applied to reduce artefact formation in images as well as preventing burns to a patient due to a specific absorption rate
7. Explore the causes of Signal to Noise Ratio deterioration and the methods to maximise relevant diagnostic data acquisition

Subject Content

1. MRI Physics in practice
2. MRI equipment relationship between the main unit and coil and channels
3. Differences in Pulsation artefacts, environmental effects and image visual artefacts and distortion
4. Contrast Media "composition and side effects"

5. Image reconstruction include k-space concept, Fourier transformation, spatial frequency in image reconstruction
6. The interactive factors on image optimisation
7. The latest hardware and software technology in fast MR imaging

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	Mandatory
Reflection	500 words each x 8	40	N	Individual	Y
Report	1,500 words	30	N	Individual	Y
Case Study	2,000 words	30	N	Individual	Y

Teaching Periods

Autumn (2025)

Online

Online

Subject Contact James Nol ([https://directory.westernsydney.edu.au/search/name/James Nol/](https://directory.westernsydney.edu.au/search/name/James%20Nol/))

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=MEDI7049_25-AUT_ON_2#subjects)