

# 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, monitor and improve signal to signal to noise ratio and reduce heat generation to prevent harm of burns to the patient.

**School** Medicine

**Discipline** Radiology

**Student Contribution Band** HECS Band 3 10cp

**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.

Item	Length	Percent	Threshold	Individual/Group Task
Reflection	500 words each x 8	40	N	Individual
Report	1,500 words	30	N	Individual
Case Study	2,000 words	30	N	Individual

Teaching Periods

## Autumn

### 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/even/timetable/?subject\\_code=MEDI7049\\_22-AUT\\_ON\\_0#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=MEDI7049_22-AUT_ON_0#subjects))