

Edinburgh Imaging

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Practicalities and Safety

Semester 2 / January

10 Credits

Each Course is composed of Modules & Activities.

Modules:

MR Health and Safety	IMSc	NI4R
Practical MR for Humans	IMSc	NI4R
Ethics and Good Clinical Practice	IMSc	NI4R
MR scanners 1.5T versus 3.0T	IMSc	NI4R
fMRI Practicalities	IMSc	NI4R
Data Protection	IMSc	NI4R
Contrast agent safety	IMSc	NI4R
Practical ultrasound imaging	IMSc	NI4R

Each Module is composed of Lectures, Reading Lists, MCQ self-assessments, & Discussion Boards.

These Modules are taught on the following Programmes, or are incorporated into blended Courses which teach students enrolled outwith the Edinburgh Imaging Academy:

- NI4R - Neuroimaging for Research programme
- IMSc - Imaging programme
- NBSc – Neuroimaging - course for BSc(Hons) Neurosciences
- NRGN - Neuroimaging Research for Graduate Neuroscientists - course for MSc Integrative Neurosciences

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Practicalities and Safety – Module details:

MR Health and Safety:

MR Health and Safety
Safe running of an MR unit

Practical MR for Humans:

Screening for contraindications and safety
Having an MR scan

Ethics and Good Clinical Practice:

Ethics of MR imaging in research

MR Scanners 1.5T versus 3.0T:

Patients and normal subjects

fMRI Practicalities:

fMRI Practicalities

Data Protection:

Privacy and data protection

Contrast agent safety:

Contrast agent safety

Practical ultrasound imaging:

Practical ultrasound imaging
Safety in ultrasound imaging

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MR Health and Safety

Lecture 1

Title: MR Health and Safety

Description: Health and safety aspects of working within high magnetic fields and other aspects of MR safety

Author(s): Mrs. Iona Hamilton, Mrs. Elaine Sandeman

Learning Objectives

- Explain how to work in a high magnetic field safely
- Describe differences in safety aspects of different types of MR scanner
- List items which may cause hazard in a magnetic field
- Discuss subject-specific factors that may affect safety

Lecture 2

Title: Safe running of an MR unit

Description: Key factors in running a safe and effective human MR scanning facility

Author(s): Prof. Joanna Wardlaw

Learning Objectives

- Outline the key factors involved in setting up and running an MR scanning facility for research in people
- Describe how to ensure safety of staff and subjects or patients being scanned
- Discuss current areas of debate concerning safety of magnetic fields and contrast agents

Practical MR for Humans

Lecture 1

Title: Screening for contraindications and safety

Description: To outline the relative and absolute contraindications to MR imaging and ensure safety while having an MR scan

Author(s): Mrs. Iona Hamilton, Mrs. Elaine Sandeman

Learning Objectives

- Describe the individual steps in preparing for an MR examination
- Summarise the major contraindications to MR
- Summarise the key things to watch out for to ensure safety

Lecture 2

Title: Having an MR scan

Description: A description of the steps involved in having an MR scan

Author(s): Mrs. Iona Hamilton, Mrs. Elaine Sandeman

Learning Objectives

- Explain what it is like to have an MR scan, from start to finish

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Ethics and Good Clinical Practice

Lecture 1

Title: Ethics of MR imaging in research

Description: Review ethical considerations of scanning humans in research

Author(s): Prof. Joanna Wardlaw

Learning Objectives

- Discuss ethical issues surrounding research scanning
- Describe frequency of incidental findings
- Discuss opinions about how to deal with incidental findings
- Explain current best practice for handling medical content of research scans

MR scanners 1.5T versus 3.0T

Lecture 1

Title: Patients and normal subjects

Description: A comparison of 1.5 versus 3T MR systems in human clinical and research scanning

Author(s): Dr. Katherine Lymer

Learning Objectives

- Explain theoretical advantages of 3T compared to 1.5T
- Outline practical considerations of higher field strengths
- Describe examples of imaging techniques translated from 1.5T to 3T
- Discuss disadvantages of 3T versus 1.5T

fMRI Practicalities

Lecture 1

Title: fMRI Practicalities

Description: A practical overview of how fMRI experiments are prepared, conducted and analysed

Author(s): Liana Romaniuk

Learning Objectives

- Describe the initial administrative steps of fMRI
- Compare the various hardware/software options
- Describe scanning parameters for fMRI
- Explain the procedure of a normal experiment

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Data Protection

Lecture 1

Title: Privacy and data protection

Description: Rules and regulations around using imaging data in research

Author(s): Dr. Andrew Farrall

Learning Objectives

- Describe what data is associated with images
- Distinguish between personal data, sensitive personal data and non-personal data
- List the eight (8) UK Data protection act 1998 principles and specific exceptions for research
- Define the various terms in Basic interpretive provisions section (1(1)) of the UK Data protection act 1998
- Explain anonymisation and pseudanonymisation
- Outline principles behind sharing data

Contrast agent safety

Lecture 1

Title: Contrast agent safety

Description: Adverse effects of contrast agents in particular considering intravascular agents

Author(s): Michael Jackson

Editor(s): Andrew Farrall

Learning Objectives

- Describe the tri-iodinated molecular structure of common intravascular x-ray contrast agents
- Relate the different molecular structures of contrast agents to their pharmacokinetic profiles
- List adverse effects associated with contrast use
- Assess risk factors for acute reactions & nephropathy

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Practical ultrasound imaging

Lecture 1

Title: Practical ultrasound imaging

Description: Description of knobs & settings, what they do and how image quality can be optimised.

Author(s): Dr Scott Inglis

Editor(s): Dr Andrew Farrall

Learning Objectives

- Identify the correct scanner, probes and presets of a specific clinical application
- Identify the main controls of the ultrasound scanner and know what they do
- State how the main scanning modalities affect the ultrasound image
- Use the scanner settings and discuss how they affect the displayed ultrasound image

Lecture 2

Title: Safety in ultrasound imaging

Description: Ultrasound safety terminology, mechanisms of harm, consequences, & safe scanning techniques

Author(s): Dr Scott Inglis

Editor(s): Dr Andrew Farrall

Learning Objectives

- Know the terminology used in safety
- List the main mechanisms for harm associated with ultrasound, and their consequences
- Identify what is available on the ultrasound scanner to allow for safe scanning
- State the recommended limits for safe scanning