Clinical Applications

Semester 1 / Autumn 10 Credits

Each Course is composed of Modules & Activities.

Modules:
- Plain Film Radiography  IMSc
- Computed tomography  IMSc
- MRI  IMSc
- Ultrasound  IMSc
- Fluoroscopy  IMSc
- Complementary Imaging Strategies  IMSc
- SPECT – PET  IMSc

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

The summary table above shows whether the modules are available in the Neuroimaging for Research (NI4R) programme or the Imaging (IMSc) programme or indeed both.
Clinical Applications - modules

Plain Film Radiography:
  Indications and advantages
  Disadvantages and limitations

Computed tomography:
  CT – advantages and indications
  Limitations and disadvantages
  CT in context – acute trauma (abdomen)

MRI:
  Indications and advantages
  Limitations and disadvantages

Ultrasound:
  Advantages and indications
  Limitations and disadvantages

Fluoroscopy:
  Indications and limitations

Complementary Imaging Strategies:
  Complementary Imaging Strategies

SPECT – PET:
  Indications and advantages
  Limitations and disadvantages

We can also provide a more detailed syllabus showing what lectures will be given for each module, and the learning outcomes for each module.
Plain Film Radiography (IMSc only)

Lecture 1
Title: Indications and advantages
Description: Review of why plain radiographs remain useful in the world of CT & MR
Author(s): Dr. Michael Jackson
Learning Objectives
• Understand common indications for plain radiographs
• List the main advantages of plain radiographs
• Be aware of practical considerations
• Discuss common image manipulation tools

Lecture 2
Title: Disadvantages and limitations
Description: Understanding and when to “by-pass”
Author(s): Dr. Michael Jackson
Learning Objectives
• Understand plain radiograph limitations
• List disadvantages of plain radiographs
• Appreciate when plain radiographs should be “by-passed”
Lecture 1
Title: CT - advantages and indications
Description: Understand what the advantages of CT as an imaging modality are in clinical practice
Author(s): Dr. Michael Jackson
Learning Objectives
- Understand what the advantages of CT as an imaging modality are in clinical practice
- Summarise the range of clinical indications for which CT is most commonly used
- Reinforce concepts such as windowing and the use of contrast agents

Lecture 2
Title: Limitations and disadvantages
Description: Risks of relatively high dose ionising radiation and recognise when an alternate imaging technique is appropriate
Author(s): Dr. Michael Jackson
Learning Objectives
- Explain the risks of relatively high dose ionising radiation
- Relate those risks to poor soft tissue contrast
- Recognise contrast administration complications
- Evaluate the potential for lack of cooperation for the examination
- Recognise when an alternate imaging technique is appropriate

Lecture 3
Title: CT in context - acute trauma (abdomen)
Description: Overview of the range of abdominal injuries and the role of CT in managing them
Author(s): Dr. Karim Samji & Dr. Andrew J. Farrall
Learning Objectives
- Discuss the causes and mechanisms which cause injury to abdominal organs
- Know which organs are likely affected
- Outline the imaging approach to abdominal trauma
- Outline how imaging influences management
- Describe major findings on CT to traumatically injured organs
MRI (IMSc only)

Lecture 1
Title: Indications and advantages
Description: Why MR is used clinically and in what situations
Author(s): Dr. Michael Jackson & Dr. Andrew J. Farrall
Learning Objectives
- Describe the main advantages of MR
- State common indications for MR
- Identify sequences and techniques
- List some contextual situations where MR sequences and techniques are applied

Lecture 2
Title: Limitations and disadvantages
Description: Problems, limitations and common artefacts
Author(s): Dr. Michael Jackson & Dr. Andrew J. Farrall
Learning Objectives
- List major problems associated with the MR technique
- Discuss inherent imaging limitations of MR
- Name common artefacts which can degrade images

Ultrasound (IMSc only)

Lecture 1
Title: Advantages and indications
Description: Colour flow components, modes features and artefacts
Author(s): Dr. Michael Jackson & Dr. Andrew J. Farrall
Learning Objectives
- State the main advantages of ultrasound
- Discuss common indications for using ultrasound

Lecture 2
Title: Limitations and disadvantages
Description: Main limitations and practical disadvantages of ultrasound
Author(s): Dr. Michael Jackson & Dr. Andrew J. Farrall
Learning Objectives
- Discuss the main imaging limitations of ultrasound
- State some of the practical disadvantages
Fluoroscopy (IMSc only)

Lecture 1
Title: Indications and limitations
Description: Overview of fluoroscopic techniques and applications
Author(s): Dr. Michael Jackson & Dr. Andrew J. Farrall
Learning Objectives
- Describe the design of a fluoroscopy machine
- Describe the design of an image intensifier
- Discuss advantages & disadvantages of fluoroscopy
- State generic clinical situations & indications for fluoroscopy

Complementary Imaging Strategies (IMSc only)

Lecture 1
Title: Complementary Imaging Strategies
Description: How imaging techniques and strategies are employed together
Author(s): Dr. Michael Jackson & Dr. Andrew J. Farrall
Learning Objectives
- State that there is no best imaging modality
- Describe the complementarity of different modalities
- Discuss step-wise and parallel modality use
- Consider factors for appropriate imaging selection
SPECT – PET (IMSc only)

Lecture 1
Title: Indications and advantages
Description: PET/CT in oncology
Author(s): Dr. Alan Simms

Learning Objectives
Discuss oncological applications of PET/CT
- Describe how PET/CT guides cancer staging
- Describe how PET/CT guides cancer treatment
- Describe how PET/CT guides monitoring post-treatment
- Know several specific cancer applications of PET/CT

Lecture 2
Title: Limitations and disadvantages
Description: Costs, radiation dose and staffing for PET/CT; Artefacts, false positives and incidental findings
Author(s): Dr. Alan Simms

Learning Objectives
- Know PET/CT is limited by cost & radiation
- Recognise the need for experienced reporters
- Discuss PET/CT artefacts
- Discuss PET/CT false positives & false negatives
- Discuss PET/CT incidental findings