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# 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.**

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

- IMSc - Imaging programme

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# 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

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# Plain Film Radiography

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”

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# Computed tomography

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

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# MRI

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

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

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## Fluoroscopy

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

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

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# SPECT – PET

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