Unit 19: Medical Physics Applications in the Health Sector

Delivery guidance

Approaching the unit

This unit is about the types of radiation used in medical imaging, diagnosis and treatment. Learners would benefit from the opportunity to visit a radiology department, ideally for work experience, to see the different techniques that are being used in real-life situations. If this is not possible, a radiologist could be invited to talk about how they use the different techniques in their work.

Delivering the learning aims

Learning aims A and B allow learners to understand how non-ionising and ionising are used in the diagnosis and treatment of service users. These learning aims could be covered by a mixture of individual research applied to case studies which are then used as a basis for class discussion.

Learning aim C covers the risks, side effects and safety precautions that are relevant to the different techniques. Practical observation of a radiology department would allow learners to appreciate how this works in practice. This could be backed up by individual research into the reasons for the practical measures they have seen implemented. If visiting an appropriate medical department is not possible, asking a visiting practitioner to talk about the measures they have to use in their work would help make the theory more relevant for learners.

Assessment model

Learning aim	Key content areas	Recommended assessment approach
A Understand how non-ionising radiation instrumentation techniques are used for diagnosis and treatment of the human body	**A1** Light amplification by stimulated emission of radiation (laser) **A2** Magnetic resonance imaging (MRI) **A3** Infrared thermography (IRT) **A4** Ultrasound principles and production	A report based on a case study evaluating correct ionising and non-ionising treatment options with scientific posters, diagrams, flow charts, tables and mind maps.
B Understand how ionising radiation instrumentation techniques are used for diagnosis and treatment of the human body	**B1** Gamma rays **B2** X-rays	
C Explore the risks, side effects and health and safety precautions for ionising and non-ionising radiation	**C1** Risks and side effects of ionising and non-ionising radiation **C2** Safety precautions for operators and service users	A report on the risks, side effects and health and safety rules for service users and operators relating to ionising and non-ionising radiation, with tables, scientific posters and images.

Assessment guidance

This unit is internally assessed. There is a maximum number of two summative assignments for this unit. Tutors should refer to the assessment guidance in the specification for specific detail, particularly in relation to the requirements for Pass, Merit and Distinction grades.

It is suggested that learning aims A and B are assessed through a written report that includes scientific posters, diagrams, flow charts and mind maps. In the report learners must cover the different radiation techniques and these must be linked to a specific service user. It is suggested that this is done through a case study that allows the learner to access all the criteria.

Learners should be encouraged to use scientific posters, diagrams, flow charts and mind maps to support their explanations of the different kinds of radiation and the way the techniques are used.

For learning aim C it is suggested that learners are assessed through a written report that reviews the health and safety precautions taken to minimise the risks and side effects associated with different radiation techniques. This should include the risks and safety precautions for both the service user and the operators.

Getting started

This gives you a starting place for one way of delivering the unit, based around the recommended assessment approach in the specification.

Introduction
Introduce this unit by discussing what experiences learners have had of imaging techniques, either themselves or through people they know. Ask learners to create a mind map of the different techniques they have heard of and ask them to add to the mind map as they go though the unit if they come across unfamiliar techniques. Learners would also benefit from the opportunity to visit or have work experience in a radiology department. If this is not feasible, it may be possible to invite a radiologist to explain the techniques they use in their work.
Learning aim A: Understand how non-ionising radiation instrumentation techniques are used for diagnosis and treatment of the human body
• For A1, A2, A3 and A4 learners could start by creating a mind map of what they know about the different types of *non-ionising* radiation and how they can be used in diagnosis and treatment. They should do individual research to produce notes on each technique, which can then be used to suggest the appropriate methods for different case studies. These case studies could be used as a basis for class discussion about the different techniques. A visit to a radiology department or a presentation from a visiting practitioner would make the theory much more relevant for learners.
Learning aim B: Understand how ionising radiation instrumentation techniques are used for diagnosis and treatment of the human body
• For B1 and B2 learners could start by creating a mind map of what they know about the different types of *ionising* radiation and how they can be used in diagnosis and treatment. They should do individual research to produce notes on each technique, which can then be used to suggest the appropriate methods for different case studies. These case studies could be used as a basis for class discussion about the different techniques. A visit to a radiology department or a presentation from a visiting practitioner would make the theory much more relevant for learners.

Learning aim C: Explore the risks, side effects and health and safety precautions for ionising and non-ionising radiation
• For C1 and C2 individual research into the risks from radiation and the relevant safety precautions and legislation could be used to inform the questions that could be put to a visiting speaker or asked during a visit to a radiology department.

Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

This unit links to:

- Unit 2: Anatomy and Physiology for Health and Social Care
- Unit 5: Principles of Safe Practice in Health and Social Care

Resources

Textbooks

Annets, F, Hartley, J, Hocking, S, Llewellyn, R, Meunier, C, Parmar, C and Peers, A – *BTEC National Applied Science Student Book 1* (Pearson, 2016)
ISBN 9781292134093

Annets, F, Hartley, J, Hocking, S, Llewellyn, R and Meunier, C – *BTEC National Applied Science Student Book 2* (Pearson, 2017)
ISBN 9781292134130

Website

https://www.physio-pedia.com/Medical_Imaging

An overview of the different techniques with links to further information.

Pearson is not responsible for the content of any external internet sites. It is essential for tutors to preview each website before using it in class so as to ensure that the URL is still accurate, relevant and appropriate. We suggest that tutors bookmark useful websites and consider enabling students to access them through the school/college intranet.