Unit 116: Ionising Radiation Engineering in Practice

Level: 4

Unit type: Optional (Medical Physics)

Credit value: 15

Guided learning hours: 120

Unit summary

In this unit, you will acquire the knowledge and skills to work as a Healthcare Science Associate within a clinical engineering department working in radiation engineering. You will be able to work safely in the radiation engineering environment, with the emphasis on health and safety, risk management, risk assessment and responding to radiation equipment-related incidents. You will be expected to build your professional practice and use critical reflection to review and improve your performance in the workplace and develop skills to promote continuous professional development.

All learners must complete all generic health and safety and mandatory training contextualised to own area of practice.

Unit assessment requirements

There are no specific assessment requirements for this unit. Please refer to the assessment strategy in *Annexe B*.

Additional information

All procedures must be undertaken in accordance with Standard Operating Procedures (SOPs) and legislation.

AC1.1 includes:

- the relevant safety features in radiotherapy treatment rooms
- relevant health and safety legislation and local policy in all work environments, including:
    - local rules for work with ionising radiation within the x-ray department
    - local rules for work with ionising radiation within the radiotherapy department
    - Ionising Radiation Regulations 1999
    - Ionising Radiation (Medical Exposure) Regulations 2000
- the restrictions that apply in controlled areas and the importance of these restrictions.

AC1.2 includes:

- regulatory frameworks
- legislation
- policy
- quality management systems and good practice.

AC1.11 includes:

- room design
- shielding
- interlocks.

AC3.1 includes:

- MDT providing diagnostic procedures and treatment to individuals.

AC3.5 could include:

- x-ray
- cardiac catheterisation
- imaging.

AC4.1 includes an appreciation of the test equipment used to undertake the measurements.

Learning outcome 7 includes:

- diagnostic x-ray rooms
- radiotherapy treatment rooms.

Learning outcomes and assessment criteria

To pass this unit, learners need to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria outline the requirements that the learner is expected to meet **in own area of work and in accordance with Standard Operating Procedures (SOPs)** to achieve the learning outcomes and the unit.

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand safe working practices in radiation engineering	1.1	Explain the health and safety policies and regulatory framework in radiation engineering			
		1.2	Explain the quality-assurance processes underpinning safety and good practice in radiation engineering			
		1.3	Identify appropriate sources of information and guidance on health and safety issues			
		1.4	Explain personal responsibilities regarding processes and procedures within own area of practice			
		1.5	Describe the local and national regulatory incident identification and escalation process			
		1.6	Explain the roles and responsibilities of staff, including the radiation protection advisor (RPA) and radiation protection supervisor (RPS)			
		1.7	Evaluate the organisation of radiological protection, radiation safety policies and local rules in own area of work			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		1.8	Explain the potential hazards and risks in diagnostic x-ray rooms			
		1.9	Explain the relevant safety features in diagnostic x-ray rooms			
		1.10	Explain the potential hazards and risks in radiotherapy treatment rooms			
		1.11	Explain the basic environmental requirements needed to support ionising radiation imaging and treatments			
2	Be able to communicate effectively in the radiation engineering environment	2.1	Explain the importance of effective communication skills within the healthcare environment			
		2.2	Communicate scientific and engineering information at a level appropriate to the audience, including the public			
		2.3	Adapt communication to meet varying needs and overcoming barriers to understanding			
		2.4	Treat every patient/carer with compassion, dignity and respect, maintaining the highest standards of person-centred care			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Understand the work of the radiation engineering department	3.1	Explain the role of radiation engineering in healthcare and healthcare science			
		3.2	Explain the range of procedures undertaken in radiation engineering			
		3.3	Explain the phases in the equipment life cycle and how it is used with medical engineering			
		3.4	Explain the potential impact of radiation engineering on the patient, patient care, staff healthcare services			
		3.5	Explain the common clinical uses of radiation			
		3.6	Explain how the principles of patient-centred care are embedded in own area of practice			
4	Be able to assist in the measurement of the performance characteristics of an X-ray tube or linear accelerator	4.1	Explain the typical routine measurements that are undertaken to ensure the quality assurance of equipment that emits radiation			
		4.2	Contribute to the set-up of equipment for quality-assurance measurements			
		4.3	Assist in the procedure of obtaining measurements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to perform health and safety risk assessments in radiation safety in accordance with SOPs	5.1	Explain the principles of risk assessment using current statutory and professional guidance			
		5.2	Discuss the range of risk assessments performed, where they are filed and how to access them			
		5.3	Perform a health and safety risk assessment in accordance with SOPs			
		5.4	Explain the requirements for accurate record keeping			
		5.5	Complete all records accurately, storing in correct location for future use			
6	Be able to assist radiation engineers in a range of environments, adhering to safety restrictions and regulations	6.1	Assist radiation engineers working in diagnostic x-ray rooms			
		6.2	Assist radiation engineers working in radiotherapy rooms			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
7	Understand how to complete an incident report in accordance with local procedures	7.1	Explain the incident reporting process			
		7.2	Explain the local and national regulatory incident identification and escalation process			
		7.3	Explain the process of equipment-related indent reporting to MHRA and equipment manufacturers			
		7.4	Explain the process of equipment-related warning notice distribution Complete an incident report under supervision			
		7.5	Explain the role of the radiation protection supervisor, medical physics expert and radiation protection adviser with regard to a radiation-related incident			
		7.6	Explain how to complete an incident report			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)