Module Specification

Applied Medical Physics

Version: 2025-26, v1.0, 26 Feb 2025

Contents

Part 1: Information

Module title: Applied Medical Physics

Module code: USSYQL-60-2

Level: Level 5

For implementation from: 2025-26

UWE credit rating: 60

ECTS credit rating: 30

College: College of Health, Science & Society

School: CHSS School of Applied Sciences

Partner institutions: None

Field: Applied Sciences

Module type: Module

Pre-requisites: Clinical Applications of Medical Physics 2025-26, Introduction to Radiation Physics and Safety 2025-26

Excluded combinations: None

Co-requisites: None

Continuing professional development: Yes

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module explores applied topics in medical physics relating to radiation detection and measurement, medical imaging and radiotherapy.

Pre-requisites: Students must have passed USSJRC-45-1 Introduction to Radiation Physics and Safety 2024-25 and USSJRR-45-1 Clinical Applications of Medical Physics before starting this module.

Features: Not applicable

Educational aims: The aims of this module are to ensure that the apprentice understands the underlying theory, principles of operation and clinical applications of a range of instrumentation used in medical physics for the detection of radiation, diagnostic imaging and radiotherapy. The apprentice should also understand the requirements for quality management systems and their implementation in medical physics.

Outline syllabus: The indicative syllabus is as follows:

Principles and applications of detector systems (including but not limited to):

- Gas filled detectors
- Scintillator detectors
- Semiconductor detectors
- Personnel and environmental dose monitoring

Medical Imaging Systems Instrumentation and Application:

- Theory of image formation in tomographic imaging
- Display, analysis and storage of images

Principles of operation, common clinical applications and risks/benefits of common imaging modalities (including but not limited to):

- X-ray systems
- Computed tomography (CT)
- Nuclear medicine
- Magnetic resonance imaging (MRI)
- Ultrasound
- Principles of hybrid imaging

Radiotherapy Instrumentation and Application:

- Radiotherapy external treatment units
- Radiotherapy treatment planning systems
- Brachytherapy systems
- Principles of dosimetry in radiotherapy

Principles of radiation dose limitation:

- Risk assessment and contingency plans
- Engineering controls and shielding requirements
- Environmental radiation surveys
- Contamination monitoring and decontamination

Basic quality systems:

- International and national legislation, guidance, standards and recommendations
- Record keeping
- Risk assessments and risk-based analysis
- Basic acceptance and safety testing
- Basic quality control requirements

Part 3: Teaching and learning methods

Teaching and learning methods: This module will be delivered via a blended approach of on-campus practical and skills development activities held during block release weeks, and online lectures, seminars and tutorials, held throughout the academic year. This will be backed up by the apprentices carrying out guided self-study.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Discuss different approaches used to monitor radiation and their role in personal and environmental monitoring.

MO2 Describe and explain the principles of operation and applications of a range of ionising and non-ionising imaging modalities.

MO3 Describe and explain the principles of operation and applications of therapeutic equipment.

MO4 Explain the role and implementation of quality systems in medical physics.

MO5 Discuss the principles of dose limitation as applied to imaging and therapeutic applications of medical physics.

Hours to be allocated: 600

Contact hours:

Independent study/self-guided study = 200 hours

Face-to-face learning = 80 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/ussyql-60-2.html

Part 4: Assessment

Assessment strategy: Assessment 1: Portfolio (max 1500 words for each piece of graded evidence)
This assessment comprises a portfolio of evidence collated from the workplace. Two components will be assessed. This will include a case-based discussion formed as a presentation on imaging and a write up of quality assurance tests carried out personally in the workplace.

This assessment links directly to requests from employers as they require medical physics graduates proficient at written and visual communication.

Students are supported to succeed in the portfolio assessment by practical assistance from their workplace assessors and by review of a draft copy of the assessment with feedback, before final submission.

Assessment 2: Examination (2 hours)
This assessment will provide apprentices with an opportunity to demonstrate their knowledge on a broad range of topics on Medical Physics. This will be a mix of short and longer answer questions for apprentices to complete.

Formative assessment will be carried out using online quizzes, example sheets, online resources etc. Use will also be made of peer based discussions and feedback

Assessment tasks:

Portfolio (First Sit)
Description: Portfolio of evidence collated from the workplace.
Weighting: 60 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO4

Examination (First Sit)
Description: Examination (2 hours)
Weighting: 40 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Portfolio (Resit)
Description: Portfolio of evidence collated from the workplace.
Weighting: 60 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO4

Examination (Resit)
Description: Examination (2 hours)
Weighting: 40 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Healthcare Science (Nuclear Medicine) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2024-25

Healthcare Science (Radiation Physics) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2024-25

Healthcare Science (Radiotherapy Physics) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2024-25