Module Specification

Radiotherapy Physics

Version: 2026-27, v1.0, 27 Feb 2025

Contents

Part 1: Information

Module title: Radiotherapy Physics

Module code: USSYQX-60-3

Level: Level 6

For implementation from: 2026-27

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: Applied Medical Physics 2026-27

Excluded combinations: None

Co-requisites: None

Continuing professional development: Yes

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module explores advanced topics in Radiotherapy Physics.

Students complete this module aligned to the Healthcare Science (Medical Physics) Radiotherapy Physics pathway.

Pre-requisites: Students must have passed USSYQL-60-2 Applied Medical Physics before starting this module.

Features: This module is available as CPD.

Educational aims: This module explores the application and underlying theory of medical physics aspects of radiotherapy, including radiation therapy equipment, treatment planning, and dose measurement techniques.

Outline syllabus: The indicative syllabus of the modules is as follows:

- An introduction to cancer biology, tumour pathology, and radiobiology relevant to radiotherapy.

- Context for radiotherapy including referral pathways and associated treatment options.

- Construction and principles of operation of a range of common radiotherapy pre-treatment and treatment equipment.

- Beam parameters for a range of therapeutic radiation beams including kV photons, MV photons, and MeV electrons.

- The underpinning theories of radiation dosimetry, as well as dose measurement techniques for therapeutic radiation beams including the relevant guidelines and Codes of Practice.

- Quality Assurance and Quality Control for a range of treatment and pre-treatment equipment aligned to National and International guidelines.

- Pre-treatment considerations including immobilisation techniques, motion management, and imaging.

- Treatment planning system modelling and dosimetric verification of radiotherapy dose distributions.

- Radiotherapy treatment planning including target definition, plan creation, optimisation and dose calculation.

- Dose verification including Image Guided Radiotherapy (IGRT) strategies and Adaptive Radiotherapy (ART).

- Ablative therapies such as Stereotactic Radiosurgery (SRS) and Stereotactic Ablative Radiotherapy (SABR).

- An introduction to brachytherapy for permanent and temporary implants.

- An introduction to therapeutic nuclear medicine.

- Radiation safety for radiotherapy equipment including shielding, room design, and associated legislative requirements.

Part 3: Teaching and learning methods

Teaching and learning methods: Students will learn about radiotherapy medical physics through lectures and tutorials. In-person block week practical classes and tutorials will reinforce the learning, alongside peer support group tasks which will enable the students to carry out peer-to-peer learning and prepare for assessments.

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

MO1 Critically evaluate the role of radiotherapy in the cancer pathway, the principles of radiobiology, and treatment strategies in radiotherapy.

MO2 Compare and contrast radiotherapy equipment, including the characteristics of the radiation produced and the associated Quality Assurance procedures.

MO3 Critically evaluate radiation dose measurement techniques for a range of radiotherapy applications, utilising National and International standards.

MO4 Critically appraise the principles relating to the creation of radiotherapy treatment plans and calculating dose distributions within patients, applying skills of analysis and judgement.

MO5 Explain the principles of radiation protection in radiotherapy and the underpinning regulatory frameworks.

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/ussyqx-60-3.html

Part 4: Assessment

Assessment strategy: Assessment 1: Portfolio (1500 word limit on written case review and 15 minutes presentation)
This assessment comprises a portfolio of evidence collated from the workplace. The portfolio includes a recorded presentation evaluating radiotherapy equipment and a written case review on treatment planning and associated dose measurement quality assurance procedures.

This assessment links directly to professional competencies. The two pieces of work will assess scientific writing, literature review skills and presentation skills. The requirement for the apprentice to base this on their own clinical work will minimise the opportunity for plagiarism.

Apprentices will be supported to succeed through the provision of examples, discussion of literature and opportunities to practice presentation skills. Formative feedback will be provided on the pass/fail portfolio competencies midway through the semester.

Assessment 2: Examination (2 hours)
The examination will allow the apprentice to demonstrate their understanding of essential principles underlying their work ensuring that they are safe to practice.

All learning outcomes are assessed in the examination as it tests time critical decision making and essential knowledge relating to clinical radiotherapy physics.

Formative support for this assessment takes the form of 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: 70 %
Final assessment: No
Group work: No
Learning outcomes tested: MO2, MO3, MO5

Examination (First Sit)
Description: Examination (2 hours)
Weighting: 30 %
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: 70 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Examination (Resit)

Description: Examination (2 hours)

Weighting: 30 %

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