Module Specification

Principles of Radiotherapy Planning and Simulation

Version: 2022-23, v1.0, 31 Aug 2021

Contents

Part 1: Information

Module title: Principles of Radiotherapy Planning and Simulation

Module code: UZYKGH-15-2

Level: Level 5

For implementation from: 2022-23

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Health & Applied Sciences

Department: HAS Dept of Allied Health Professions

Partner institutions: None

Delivery locations: Glenside Campus

Field: Allied Health Professions

Module type: Project

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module combines the development of practical planning and virtual simulation skills with an examination of the application of fundamental radiation physics and clinical radiobiology concepts underpinning radiotherapy treatment.

Practical planning skills will build on those introduced in module (Clinical Context and

Applications to Radiotherapy 1) enabling you to safely design and prepare a course of radiotherapy for a range of techniques, from virtual simulation through to plan evaluation and interpretation of dose statistics.

Features: Not applicable

Educational aims: In this module you will apply your knowledge of cross-sectional anatomy, tumour specific physiology, radiation physics, dosimetry, radiobiology – including tolerance doses - and radiotherapy techniques. The module highlights current legislation and guidance for standardising methods of target volume definition, conformance, plan evaluation / interpretation and dose reporting.

This module is closely aligned with the practice module (Professional Development and Clinical Radiotherapy Practice) which runs concurrently whereby you will further apply and develop your planning skills in the clinical setting to include a range of treatment sites and diagnoses and adapt your knowledge and skills to local departmental protocols, processes and equipment. This constructively aligned curriculum is designed to encourage deep learning of treatment planning concepts and skills in order to be able to critically appraise different planning techniques.

Outline syllabus: This syllabus typically includes:

Application of physics interactions, beam modification and dosimetry in the oncology setting

Application of tumour site-specific knowledge to treatment planning and application. For example, forward and inverse planning and considerations for patient immobilisation and tumour mobility

Applied cross sectional imaging, integrating knowledge of patient immobilisation and organ/volume movement to optimise plan for organs at risk, tolerance doses and evaluate these factors with regard

to treatment side effects.

General introduction to biological modelling, fractionation and volume effects.

Beam modelling for radiotherapy treatment planning, to include convolution/pencil beam and Monte Carlo approaches.

Error management and quality assurance systems in radiotherapy treatment planning

Preparation of plan for treatment delivery' within the multidisciplinary team. Consideration of paper light and paperless environments.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled learning includes lectures and seminars, practical sessions on the VERT system and radiotherapy planning computers. Formative assessment and feedback related to the assessment component will consist of group and independent planning practical tutorials. Students will require a minimum of 5 scheduled planning practical sessions.

Independent learning includes hours engaged with essential reading, completion of dosimetry planning portfolio and interactive online learning materials, assessment preparation.

Formative assessment opportunities throughout the module will enable students to develop practical experience of undertaking a range of treatment planning tasks with feedback in preparation for the summative assessment.

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

MO1 Undertake practical application knowledge of treatment simulation and radiotherapy planning in order to generate, calculate and evaluate radiotherapy treatment plans for a range of treatment delivery techniques, applying underpinning scientific principles that govern radiotherapy prescriptions

MO2 Discuss and apply international legislation that impacts on quality control principles within radiotherapy treatment simulation, planning and dosimetry

MO3 Apply knowledge of regional and cross -sectional anatomy and evaluate how this anatomy impacts upon the treatment planning process

MO4 Critically appraise a range of planning techniques using knowledge gained through enquiry, in the classroom setting and the clinical environment

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 113 hours

Face-to-face learning = 37 hours

Total = 150

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/lists/36004BC8-F1A8-70C1-B4B0-036DF6E9556C.html?lang=en-GB&login=1

Part 4: Assessment

Assessment strategy: Component A: Dosimetry and planning portfolio

Students will independently design and prepare radiotherapy treatment plans using a range of delivery techniques for a specific anatomical site. They will then critically reflect on their work, comparing and evaluating 2 of the planning techniques used and provide a supporting precis of typically 2,500 words with reference to literature and also drawing on knowledge gained in the clinical environment.

Rationale: To allow students to demonstrate knowledge and understanding of the

radiotherapy treatment planning process, principles and protocols in order to produce a clinically acceptable treatment plan and evaluate its clinical appropriateness.

This method will assess both the practical planning and simulation skills, the underpinning theory and knowledge and understanding of current clinical practices learned during the clinical placement period.

Formative learning and assessment will take place throughout the module within the planning suite and VERT to provide practical experience of undertaking a range of treatment planning tasks in preparation for the summative assessment.

Assessment components:

Portfolio - Component A (First Sit)
Description: Dosimetry and Planning portfolio
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Portfolio - Component A (Resit)
Description: Dosimetry and Planning portfolio
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Radiotherapy and Oncology [Sep] [FT] [Glenside][3yrs] BSc (Hons) 2021-22