

Course Outline

MDPH405 Radiation Therapy

15 points

Second Semester 15 Jul 2024 – 09 Nov 2024

Course Coordinator

Bryn Currie
Location: JVH732
Office hours: Mon 12:00-13:30
Phone: 027 365 6809
Email: bryn.currie@canterbury.ac.nz

Lectures

Monday	11:00-12:00	Rehua 530
Tuesday	11:00-12:00	Ernest Rutherford 260
Wednesday	11:00-12:00	Karl Popper 508

There are exceptions to the above lecture days and times during the first six weeks of the course. A detailed timetable will be available on *Learn*.

Description

The purpose of this paper is to provide students with a general basic understanding of the practice and principles of radiotherapy physics, suitable as a background for entry into a training program in medical physics, in particular radiation oncology medical physics.

Assessment

15%	Report
10%	Presentation
15%	Mid-term test
60%	Final exam

NB: a pass in the final exam is required to pass the course.

Pre-requisites

Subject to the approval of the director of the programme.

Textbooks

Required Textbooks:

- S Dieterich et al., *Practical Radiation Oncology Physics*, Elsevier, 2016
- J. Van Dyk (Ed.), *The Modern Technology of Radiation Oncology: A Compendium for Medical Physicists and Radiation Oncologists*, Medical Physics Publishing, 1999

Recommended Reading:

- F. M. Khan and J P Gibbons, *Khan's the Physics of Radiation Therapy*, 6th ed., Wolters Kluwer Health, 2019
- E. B. Podgorsak (Ed.), *Radiation Oncology Physics: A Handbook for Teachers and Students*, IAEA, 2005

Additional Reading:

- J. Van Dyk (Ed.), *The Modern Technology of Radiation Oncology, Volume 2: A Compendium for Medical Physicists and Radiation Oncologists*, Medical Physics Publishing, 2005
- J. Van Dyk (Ed.), *The Modern Technology of Radiation Oncology, Volume 3: A Compendium for Medical Physicists and Radiation Oncologists*, Medical Physics Publishing, 2013
- D Greene and P C Williams, *Linear Accelerators for Radiation Therapy*, 2nd ed., Taylor and Francis Group, 1997
- E Halperin, C Perez and L Brady (Eds.), *Perez and Brady's Principles and Practice of Radiation Oncology*, 5th ed., Lippincott Williams and Wilkins, 2008
- A Barrett et al., *Practical Radiotherapy Planning*, 4th ed., Hodder Arnold, 2009
- A Gerbaulet (Ed.) et al., *The GEC ESTRO Handbook of Brachytherapy*, ESTRO, 2002
- G Knoll, *Radiation Detection and Measurement*, 4th ed., John Wiley & Sons Ltd, 2010

Learning Outcomes

On completion of this course, students should be able to:

- Describe the basic principles underlying radiotherapy methods
- Understand the principles of radiotherapy equipment
- Understand the characteristics of clinical beams and their measurements

- Describe and understand basic quality control procedures for equipment in radiotherapy
- Understand dosimetry measurements used in radiotherapy
- Understand basic treatment planning in radiotherapy
- Discuss a range of clinical applications

Summary of Course Content

The general topics covered by this course are:

- Introduction to clinical radiation therapy
- History and development of radiation therapy
- Treatment machines – physical and clinical aspects
- Treatment machines – technical aspects
- Commissioning of radiotherapy equipment
- Phantoms used in radiotherapy
- Quality assurance
- Clinical dosimetry – photons and electrons
- Dosimetry protocols
- Instrumentation for dosimetry
- Primary standards and traceability for dosimetry
- Introduction to brachytherapy
- Treatment techniques in radiation therapy
- Treatment simulation
- Patient positioning
- Treatment planning

All important course information will be accessible through the UC *Learn* system available at <http://learn.canterbury.ac.nz/>. You need to login with your UC login and password and then select the course code on the left-hand side. Make sure you check the *Learn* page regularly for relevant information and course updates.

Note that all course related emails will be sent to your UC email address. No other email addresses will be accepted. It is your responsibility to check your UC email regularly.

General Course Information

Please consult the document [General Course Information](#) that contains information applicable to all courses administered by the School of Physical and Chemical Sciences relating to Physics and Astronomy.