**Course summary**

This course provides a practical and theoretical background to Radiotherapy with its main focus on Radiotherapy Physics aspects. The course is aimed at recently qualified radiotherapy physicists and includes an MSc module for students at Kings College, London. However, the course should also be invaluable to PhD students, post doctoral researchers, newly specialising clinical oncologists, radiotherapy engineers, radiographers, manufacturers' representatives and, in fact, anyone needing to deepen or update their understanding of this rapidly evolving field. The faculty is composed of physicists, clinical oncologists and radiographers, many of whom are internationally renowned for their expertise. Saturday workshops and demonstrations make full use of the facilities of The Royal Marsdens' Radiotherapy Departments on the Chelsea and Sutton sites. The course is reviewed annually to reflect changes in practice and developing technology.

**Fees and registration**

The cost for each full course week, including practicals, is £750. For those wishing to book the complete two weeks, the cost is £1250. Individual days of the course can be booked for £180 per day. The course meal will be an extra £40.00 per person if not attending the full week.

External, full-time PhD students with proof of academic registration can book the 8 lecture days of both weeks for a total of £600.

All fees include course materials, lunches, light refreshments, a special buffet and cheese & wine both on Friday and a course dinner on Tuesday, as appropriate. Accommodation is available in a local hotel at approximately £90 per night extra. The link for the registration form is:

[www.icr.ac.uk/research/research_divisions/Radiotherapy_and_Imaging/Training_Courses/Radiotherapy_Physics](http://www.icr.ac.uk/research/research_divisions/Radiotherapy_and_Imaging/Training_Courses/Radiotherapy_Physics)

**Course administrator**

Mrs Cheryl Taylor  
Cheryl.Taylor@icr.ac.uk  
Tel: +44 (0)208 661 3704  
Fax: +44 (0)208 643 3812

**Additional practical tutors**

Alex Backshall, David Bernstein, Irena Blasiak-Wal, Natalie Bleackley, Helen Chapman, Ruth Colgan, Patrick Conaghan, Helen Convery, Katie Edmunds, Ian Hanson, Caroline Jones, Kate Roome, Matthew Seithel, Katy Taylor, and Karole Warren-Oseni.

**Key to external lecturers**

1) Maastricht University Hospital, The Netherlands. 2) Clatterbridge Cancer Centre, The Wirral. 3) Royal Surrey County Hospital, Guildford. 4) The Christie Hospital, Manchester. 5) St James’ Hospital, Leeds. 6) Imperial College Hospitals, London. 7) Consultant Physicist, Edinburgh. 8) Cromwell Hospital, London. 9) Medical University of Vienna, Austria. 10) National Cancer Institute, Amsterdam.

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**A Course in Radiotherapy Physics**

11 – 15 November 2014  
Radiation Dosimetry, Imaging for Radiotherapy, Treatment Planning and Patient Specific Dosimetry (Sutton Site)

3 – 7 March 2015  
Radiobiology, Accelerator design and Quality Assurance, Brachytherapy and Radiotherapy Verification Imaging (Chelsea Site)
Radiation Dosimetry, Imaging for Radiotherapy, Treatment Planning and Patient Specific Dosimetry (Sutton site)

Course Organisers: Dr Vibeke Hansen and Ms Margaret Bidmead

Tuesday 11 November 2014 – Fundamentals Radiation Dosimetry

Photon Interaction Mechanisms: Electron
Interaction Mechanisms Fundamental
Principles of Dosimetry I Fundamental
Principles of Dosimetry II
Characteristics and Calculations for Photon Beams
Radiotherapy and Cancer
Ionisation Chamber Design and Measurements

Professor F Verhaegen
Professor F Verhaegen
Professor A Nahum
Mr P Childs
Dr L Welsh
Dr T Jordan

Wednesday 12 November 2014 – Imaging for Radiotherapy

Radiotherapy Applications of Monte-Carlo methods
MR Imaging for Radiotherapy Planning
PET Imaging for Radiotherapy Planning Treatment
Planning Margins; ICRU 50, 62 and 83
Stereotactic Body Radiotherapy (SBRT) for Lung Tumours
Evaluation Tools in Treatment Planning
Electron Beam Therapy in Clinical Practice

Professor F Verhaegen
Dr M Schmidt
Dr I Murray
Dr C Rowbottom
Dr V Cosgrove
Ms M Bidmead
Mr P Childs

Thursday 13 November 2014 – Treatment Planning

Photon Beam Algorithms in Treatment Planning Systems
Intensity Modulated Radiotherapy Algorithms (IMRT)
Prostate Cancer: XBRT Techniques and Trials
Quality Control in Treatment Planning
Inverse Treatment Planning for IMRT
Radiotherapy for Oesophageal and Liver Tumours
Large Field Techniques in Radiotherapy

Professor F Verhaegen
Dr J Bedford
Dr J Bedford
Dr C South
Mr R Trouncer
Mr G Smyth
Dr M Hawkins
Dr W Ingram

Friday 14 November 2014 – Patient Specific Dosimetry

Radiotherapy of the Head and Neck
Implementing New Treatment Techniques in the Clinic
Adaptive Radiotherapy for Bladder Cancer in Clinical Practice
Radiotherapy for Breast Cancer: Current and Future Practice
Guest Lecture: Dosimetry for Molecular Radiotherapy
Radiotherapy with Protons and Heavy Ions
Verification and Image based Dosimetry for IMRT
Vivo Dosimetry for Point Measurements

Dr K Newbold
Dr H McNair
Dr S Haﬁez
Dr A Kirby
Dr G Flux
Professor U Oelfke
Dr M Thomas
Dr V Hansen
Dr W Ingram

Radiobiology, Accelerator design and Quality Control, Brachytherapy and Radiotherapy Verification Imaging (Chelsea site)

Saturday workshops and demonstrations include calibration and in vivo dosimetry, treatment planning for different tumour sites, plan verification, after loading equipment, radiotherapy machine quality control, intracavitary and implant dosimetry in brachytherapy.

Tuesday 3 March 2015 – Radiobiology

Tumour Cell Radiobiology
Modelling the Probability of Tumour Control (TCP)
Radiobiology of Normal Tissues
Modelling Normal Tissue Complication Probability (NTCP)
Fractionation & iso-effect in Radiotherapy
Compensation for Treatment Gaps in Radiotherapy
Practical use of Radiobiology in Treatment Planning

Professor A Nahum
Professor A Nahum
Dr S Gulliford
Dr S Gulliford
Professor R Dale
Professor R Dale

Wednesday 4 March 2015 – Accelerator design & QA

Medical Electron Linear Accelerators:
Production of a Clinically Beam
Multileaf Collimators: Characteristics and Commissioning
Accuracy and Quality in Radiotherapy: An Overview
kV X-ray Units
Cyberknife
Tomotherapy and Gamma Knife
Quality Control of Linacs
Quality Assurance in Clinical Trials
Quality Management Systems

Dr H Porter
Professor P Mayles
Dr V Cosgrove
Professor P Mayles
Mrs L Fernandez
Mrs C Meehan
Dr D Nicholas
Dr R Moore
Mrs O Naismith
Ms M Bidmead

Thursday 5 March 2015 – Brachytherapy

Calibration and QA of Brachytherapy Sources The
Radiobiology of Brachytherapy
Intracavitary Dosimetry
Gynaecology Cancers
3D Image-Based Brachytherapy Planning
Transperineal Prostate Brachytherapy
Radiation Protection in Brachytherapy

Miss C Jones
Professor R Dale
Ms M Bidmead
Dr A Taylor
Dr C Kirisits
Mr P Bownes
Mr J Thurston

Friday 6 March 2015 – Verification Imaging

Radiation Protection in External Beam Radiotherapy
Brachytherapy for other clinical sites
IGRT Techniques
Image Quality and Patient Dose in IGRT & IMRT
EPID Imaging in Routine Practice: Quality Control and Dosimetry
Image Handling in Radiotherapy
Errors & Margins in Image Guided Radiation Therapy

Mr P Childs
Dr S Lalondrelle
Dr E Harris
Dr E Donovan
Dr V Hansen
Professor M Van Herk