

Physics of Radiation Therapy for Resident Physicians - 2023-2024 Syllabus

Time of Lecture: Thursdays from 7:00 – 7:55 AM (when RadBio in session) 8:00 - 8:55am (when no RadBio)

Location: Smilow Conference Room LL 505 or Zoom

Date	Main Topic	Lecturer
07/13/23	Overview: Radiation Therapy Workflow and Fundamentals	Draeger
07/20/23	Overview: Treatment Planning and Plan Evaluation	Draeger
07/27/23	Overview: Special Treatment Procedures and Quality Assurance	Draeger
08/03/23	Atomic & Nuclear Structures and Fundamental Physics	Nguyen
08/10/23	Production of Kilovoltage X-Ray Beams	Nguyen
08/17/23	Production of Megavoltage Radiation Beams - Basics	Carlson
08/24/23	Production of Megavoltage Radiation Beams - Linacs	Carlson
08/31/23	Production of Megavoltage Radiation Beams - Specialty Linacs	Carlson
09/07/23	Radiation Interaction: Interactions of X-and Gamma-rays with Matter	Carlson
09/14/23	Radiation Interaction: Attenuation of Photon Beams	Carlson
09/21/23	Radiation Interaction: Interactions of Particulate Radiation	Carlson
09/28/23	Beam Quality & Units	Kamath
10/05/23	ASTRO	
10/12/23	Radiation Measurement & Calibration: Determination of Dose	Tien
10/19/23	Radiation Measurement & Calibration: Detectors and Phantoms	Tien
10/26/23	Radiation Measurement & Calibration: Dose Output Calibration	Tien
11/02/23	Photon Beam Characteristics & Dosimetry: Dosimetry Concepts (Part I)	TBD
11/09/23	Photon Beam Characteristics & Dosimetry: Dosimetry Concepts (Part II)	TBD
11/16/23	Photon Beam Characteristics & Dosimetry: System of Dose Calculations (I)	TBD
11/23/23	Thanksgiving	TBD
11/30/23	Photon Beam Characteristics & Dosimetry: System of Dose Calculations (II)	TBD
12/07/23	Photon Beam Characteristics & Dosimetry: Computerized Planning	Han
12/14/23	Photon Beam Characteristics & Dosimetry: Computerized Treatment Planning Strategies	Han
12/21/23	Photon Beam Characteristics & Dosimetry: Surface Corrections and Heterogeneity Calculations	Han
12/28/23	Photon Beam Characteristics & Dosimetry: Adjoining Fields and Special Dosimetry Problems	Han
01/04/24	Electron Beam Characteristics & Dosimetry: Basic Characteristics	Deng
01/11/24	Electron Beam Characteristics & Dosimetry: Treatment Planning and MU Calculation	Deng
01/18/24	IMRT: Concepts & Delivery Systems	Chen
01/25/24	IMRT: Dose Prescription & Inverse Planning	Chen
02/01/24	IMRT: Delivery, Whole Body Dose, and QA	Chen
02/08/24	Prescribing, Reporting, and Evaluating RT treatment plans	Chen
02/15/24	Imaging Fundamentals: Radiography Fundamentals / Informatics	Hodefi
02/22/24	Imaging Fundamentals: CT and PET	Hodefi
02/29/24	Imaging Fundamentals: MRI and Ultrasound	Hodefi
03/07/24	Simulation and Treatment Verification: Simulation	Han
03/14/24	Simulation and Treatment Verification: Verification	Han
03/21/24	Special Procedure: Cranial SRS	Bond
03/28/24	Special Procedure: SBRT	Bond
04/04/24	Special Procedure: TBI & TSET	Bond
04/11/24	Brachy: Radioactivity, Decay, Radioactive Sources & Calibration	Bond
04/18/24	Brachy: Calculations of Dose Distributions	Bond
04/25/24	Brachy: Clinical Fundamentals of Brachytherapy Implants	Bond
05/02/24	Brachy: GYN Implants	Bond
05/09/24	Brachy: Prostate Brachytherapy	Bond
05/16/24	Radiopharmaceutical Physics	Bond
05/23/24	Particle Therapy: Delivery, Planning & Biology (I)	Chen
05/30/24	Particle Therapy: Delivery, Planning & Biology (II)	Chen
06/06/24	Quality Assurance: Overview and Equipment QA	Kamath
06/13/24	Quality Assurance: Process-Specific QA	Kamath
06/20/24	Radiation Safety and Shielding I	Hinchcliffe
06/27/24	Radiation Safety and Shielding II	Hinchcliffe

Textbook References:

- Physics of Radiation Therapy, FM Khan & JP Gibbons, 6th Ed. 2019
- The Physics & Technology of Radiation Therapy, 2nd Ed, PN McDermott & CG Orton, 2018
- ASTRO 2015 Physics Core Curriculum, 2016

Questions or suggestion : Please contact Zhe Chen, PhD, at zhe.chen@yale.edu or 203-200-2014