

Schedule for the advanced course on *Radiotherapy Physics and Biology*, 22.5 ECTS, 2024

Week	Day	Date	Time	Lecture title or other specified activity	Lecturer	Literature	Lecture room
36	Introductory lectures						
	Tuesday	03.09	13:00-15:00	Introduction to the course and overview of the program	IT-D		MSF Library
				Overview of Radiotherapy Physics	IT-D		
			15:00-16:00	Visit of the RT department	FVN, AR		NKS
	RT photon and electron beams: physical aspects						
Wednesday	04.09	09:00-12:00	Accelerators for radiation therapy	JÖ	IAEA 5		
37	Monday	09.09	09:00-12:00	Magnetic Resonance Linear Accelerators	DT		MSF Library
	Tuesday	10.09	09:00-12:00	Physical aspects of photon RT beams	JÖ	IAEA 6	
	Wednesday	11.09	10:00-12:00	Physical aspects of electron RT beams	JÖ	IAEA 8	
	Calibration of RT beams						
	Thursday	12.09	09:00-12:00	Calibration of high-energy photon beams	MAG	TRS-398	
Friday	13.09	09:00-12:00	Exercises on calibration of high-energy photon beams	MAG			
38	Monday	16.09	09:00-12:00	Calibration of high-energy electron beams and kV x-rays	MAG	TRS-398	MSF Library
	Tuesday	17.09	09:00-12:00	Exercises on calibration of high-energy electron beams	MAG		
	Wednesday	18.09	10:00-12:00	Calibration of protons and heavier ions	MAG		
			13:00-16:00	Dose calculation exercises	MAG		
	Thursday	19.09	16:00-18:00	Lab: Demonstration on calibration GROUP 1 <i>Reference dosimetry for photons based on TRS-398</i>	MAG		NKS
	Friday	20.09	16:00-18:00	Lab: Demonstration on calibration GROUP 2 <i>Reference dosimetry for photons based on TRS-398</i>	MAG		NKS
39	Monday	23.09	09:00-12:00	Pre-exam Calibration			Bo Nilsson Lecture room
	TPS dose calculation for external RT						
	Tuesday	24.09	09:00-12:00	Photon beam dose calculations 1	AA	Handbook	
	Wednesday	25.09	09:00-12:00	MC treatment planning	ET		
	Thursday	26.09	09:00-12:00	Electron algorithms for treatment planning	ET		
			13:00-16:00	Photon beam dose calculations 2	AA	Handbook	MSF Library
	Friday	27.09	09:30-12:00	Treatment planning: conventional and conformal RT. Practical routines in RT	ML	Handbook	
40	Monday	30.09	09:00-12:00	Inverse planning and IMRT	IT-D		
	Tuesday	01.10	09:00-12:00	Treatment planning exercises on conventional RT	KK		G5 (Apelsinen)
			13:00-16:00	IMRT planning – practical aspects	FVN		MSF Library
	Wednesday	02.10	09:00-12:00	Treatment planning exercises on conventional RT - cont	KK		G5 (Apelsinen)
13:00-14:00			Imaging for treatment planning	FVN		MSF Library	

	Thursday	03.10	13:00-16:00	Treatment planning exercises on IMRT	FVN		G5 (Apelsinen)
			16:00-18:00	IMRT verification group GROUP 1	MAG		G3 (Reception)
	Friday	04.10	16:00-18:00	IMRT verification group GROUP 2	MAG		G3 (Reception)
41	External radiotherapy: treatment modalities						
	Tuesday	08.10	09:00-12:00	IGRT	FVN, GP		
			13:00-16:00	Adaptive RT	IT-D		
	Wednesday	09.10	09:30-12:00	Stereotactic RT with GammaKnife	PB	Handbook	MSF Library
	Thursday	10.10	09:00-12:00	SBRT	KK		
			13:00-16:00	Problem based learning - Case study 1 (Session 1)	EO, FVN		
	Friday	11.10	10:00-12:00	Special RT treatment modalities: TBI, IORT	EO	Handbook	Vindskupan
			13:00-16:00	Problem based learning - Case study 1 (Session 2)	EO, FVN		
42	RT with protons, neutrons and light ions						
	Monday	14.10	10:00-12:00	Introduction to commissioning, QA and QC in RT	IT-D		
	Tuesday	15.10	09:00-12:00	Neutron Therapy and BNCT	ML		
	Wednesday	16.10	09:00-12:00	Problem based learning - Case study 2 (Session 1)	EO, FVN		
	Thursday	17.10	09:00-12:00	RT with protons	AD	Handbook	Vindskupan
			13:00-16:00	RT with light ions	AD		
	Friday	18.10	09:00-12:00	Problem based learning - Case study 2 (Session 2)	EO, FVN		
43	Acceptance, commissioning, QA and QC						
	Tuesday	22.10	09:00-12:00	Practical quality assurance and quality control	MAG		
	Wednesday	23.10	09:00-12:00	Acceptance tests and commissioning measurements for	JZ		
			13:00-14:00	Risk analysis and safety culture	JZ		
	Thursday	24.10	09:00-12:00	Failure Modes and Effects Analysis (FMEA) exercise	JZ/ MAG		
	Friday	25.10	16:00-18:00	Visit to Skandion Clinic, Uppsala			
44	Brachytherapy						
	Monday	28.10	09:00-10:00	Introduction to BT	SD		
			10:00-11:00	Treatment technique: HDR Gynaecology	SD		Vindskupan
			11:00-12:00	Treatment technique: HDR prostate	AR		
	Tuesday	29.10	13:15-14:15	Demo Oncentra Gynaecology	SD		NKS
			14:15-15:15	Demo Vitesse Prostate	AR		
	Wednesday	30.10	10:00-11:00	Source strength. Calibration	ÅCT		Vindskupan
			11:00-12:00	Dose calculation for TPS, TG43 and more	ÅCT		
			13:15-14:45	Lab exercise - source calibration GROUP 1	ÅCT		NKS
			14:45-16:15	Lab exercise - source calibration GROUP 2	ÅCT		
	Thursday	31.10	09:00-10:30	Experimental BT	ÅCT		Vindskupan
			10:45-11:45	QA in BT	ÅCT/SB		

	Friday	1.11	13:00-14:00	Treatment technique: H&N, eye	SD		
			14:00-15:00	Calculation exercises	ACT		Vindskupan
45	Radiation protection, ethical and legal issues						
	Monday	04.11	09:00-10:00	Radiation protection: calculation of shielding	MAG		
			10:00-12:00	Ethics in RT	MA1		Vindskupan
	Clinical Radiobiology						
	Tuesday	05.11	13:00-15:00	Time, dose and fractionation in RT	EKL	Hall 18,19	
			15:00-16:00	Calculation exercises	EKL		
	Wednesday	06.11	10:00-12:00	Tumour oxygenation - clinical aspects	EKL		Vindskupan
			13:00-15:00	Seminar: Combined therapies (chemo+RT, immuno+RT,	EKL		
46	Monday	11.11	09:00-10:30	Biological models in RT; Tumour control probability models	IT-D		
			10:30-12:00	Normal-Tissue Effects in RT, NTCP modelling; Plan evaluation	IT-D		MSF Library
			13:00-16:00	Seminar: Emerging treatment techniques and modalities	IT-D		
	Tuesday	12.11	09:00-12:00	Patient re-irradiation	IT-D		
			13:00-16:00	Problem based learning - Case study 3 (Session 1)	IT-D		Vindskupan
	Wednesday	13.11	09:00-10:30	Radiosurgery - radiobiological aspects	IT-D		
			10:30-12:00	Brachytherapy - radiobiological aspects	IT-D		MSF Library
			13:00-16:00	Problem based learning - Case study 3 (Session 2)	IT-D		
	Thursday	14.11	09:00-12:00	Biological optimisation and the role of functional imaging	IT-D		
			13:00-16:00	Problem based learning - Case study 4 (Session 1)	IT-D		
	Friday	15.11	09:00-12:00	Risk of secondary cancer after radiotherapy	IT-D		Vindskupan
			13:00-16:00	Problem based learning - Case study 4 (Session 2)	IT-D		
47	Active Learning exercises - Sessions 1-3						
	Monday	18.11	09:00-12:00	Lecture 1	MA2		Computer room
			13:00-14:00	Active Learning exercise - Session 1	IT-D		MSF Library
	Tuesday	19.11	09:00-12:00	Lecture 2	MA2		
	Wednesday	20.11	09:00-12:00	Lecture 3	MA2		Computer room
			13:00-16:00	Active Learning exercise - Session 2	IT-D		MSF Library
	Thursday	21.11	09:00-12:00	Lecture 4	MA2		
	Friday	22.11	09:00-12:00	Lecture 5	MA2		Computer room
			13:00-16:00	Active Learning exercise - Session 3	IT-D		MSF Library
48	Active Learning exercises - Sessions 4-5						
	Wednesday	27.11	09:00-10:00	Active Learning exercise - Session 4	IT-D		
			10:00-12:00	Discussions	IT-D		MSF Library

Friday

29.11 09:00-14:00

EXAMINATION

Bo Nilsson Lecture room

Lecturers:

AA	Anders Ahnesjö	Professor, Uppsala University, Uppsala
MA1	Mirko Ancillotti	Researcher, PhD, Centre for Research Ethics & Bioethics in Uppsala
MA2	Mehdi Astaraki	Researcher, PhD, Stockholm University, Stockholm
PB	Pierre Barsoum	Medical Physicist, MSc, Karolinska Universitetssjukhuset, Stockholm
SB	Sara Bornedal	Medical Physicist, MSc, Karolinska Universitetssjukhuset, Stockholm
ÅCT	Åsa Carlsson-Tedgren	Professor, Medical Physicist, Karolinska Universitetssjukhuset, Stockholm
SD	Simon Dahlander	Medical Physicist, MSc, Karolinska Universitetssjukhuset, Stockholm
AD	Alexandru Dasu	Associate Professor, Medical Physicist, Skandion Clinic, Uppsala
MAG	Mohammed Ali Ghazal	Medical Physicist, MSc, Karolinska Universitetssjukhuset, Stockholm
KK	Kristin Karlsson	Medical Physicist, PhD, Karolinska Universitetssjukhuset, Stockholm
EKL	Emely Kjellsson Lindblom	Lecturer, PhD, Medical Physicist, PhD, Stockholm University, Stockholm
ML	Marta Lazzeroni	Lecturer, PhD, Medical Physicist, PhD, Stockholm University, Stockholm
FNV	Fernanda Villegas Navarro	Physicist, PhD, Karolinska Universitetssjukhuset, Stockholm
EO	Eva Onjukka	Medical Physicist, PhD, Karolinska Universitetssjukhuset, Stockholm
GP	Gavin Poludniowski	Researcher, PhD, Karolinska Universitetssjukhuset, Stockholm
AR	Apostolos Raptis	Medical Physicist, MSc, Karolinska Universitetssjukhuset, Stockholm
DT	David Tilly	Researcher, PhD, Uppsala University
IT-D	Iuliana Toma-Dasu	Professor, Medical Physicist, Stockholm University, Stockholm
ET	Erik Traneus	Senior Researcher, PhD, RaySearch Laboratories AB, Stockholm
JZ	Jens Zimmerman	Medical Physicist, MSc, Karolinska Universitetssjukhuset, Stockholm
JÖ	Jakob Öden	Medical Physicist, PhD, RaySearch Laboratories AB, Stockholm

Literature:

¹Podgorsak E B: Radiation Oncology Physics: A Handbook for Teachers and Students *International Atomic Energy Agency* 2005

²Technical Series Report No. 398 *International Atomic Energy Agency* 2000

³International Commission on Radiation Units & Measurements Report 42 1987

⁴Mayles P, Nahum A, Rosenwald J C: Handbook of Radiotherapy Physics: Theory and Practice *Taylor and Francis* 2007

⁵International Commission on Radiological Protection Publication 112 Preventing Accidental Exposures from New External Beam Radiation Therapy Technologies 2009

⁶Hall E J and Giaccia A J: Radiobiology for the Radiologist *Lippincott Williams and Wilkins* 2006