

Schedule for the advanced course on *Radiotherapy Physics and Biology*, 22.5 ECTS, 2026/2027

Week	Day	Date	Time	Lecture title or other specified activity	Lecturer	Literature	Lecture room	
36	Introductory lectures							
	Monday	31.08	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							
	Tuesday	01.09	09:00-12:00	Physical aspects of photon RT beams	AD	IAEA 6	MSF Library	
	Wednesday	02.09	09:00-12:00	Physical aspects of electron RT beams	AD	IAEA 8		
	Calibration of RT beams							
	Thursday	03.09	09:00-12:00	Calibration of high-energy photon beams	MAG	TRS-398	MSF Library	
	Friday	04.09	09:00-12:00	Exercises on calibration of high-energy photon beams	MAG			
37	Monday	07.09	09:00-12:00	Calibration of high-energy electron beams and kV x-rays	MAG	TRS-398	MSF Library	
	Tuesday	08.09	09:00-12:00	Exercises on calibration of high-energy electron beams	MAG			
			13:00-15:00	Calibration of protons and heavier ions	MAG	TRS-398	MSF Library	
			15:00-16:00	Time to activate the accounts for the TP exercises	FVN		NKS	
	Wednesday	09.09	13:00-16:00	Dose calculation exercises	MAG	TRS-398	MSF Library	
			16:00-18:00	Lab: Demonstration on calibration GROUP 1 Reference dosimetry for photons based on TRS-398	MAG		NKS	
	Thursday	10.09	09:15-17:30	Workshop - Beyond One-Size-Fits-All Radiotherapy: Biological Guidance from Imaging to Trials	Royal Swedish Academy of Sciences			
	Friday	11.09	09:00-15:00					
			16:00-18:00	Lab: Demonstration on calibration GROUP 2 Reference dosimetry for photons based on TRS-398	MAG		NKS	
	38	Monday	14.09	09:00-12:00	Pre-exam Calibration	Bo Nilsson Lecture room		
External RT equipment								
Tuesday		15.09	09:00-12:00	Accelerators for radiation therapy	AD	IAEA 5	MSF Library	
Wednesday		16.09	09:00-12:00	Magnetic Resonance Linear Accelerators	DT			
TPS dose calculation for external RT								
Thursday		17.09	09:30-12:00	Treatment planning: conventional and conformal RT. Practical routines in RT	ML	Handbook	MSF Library	
				13:00-16:00	Electron algorithms for treatment planning	ET		
Friday		18.09	09:00-12:00	MC treatment planning	ET			
39		Monday	21.09	09:00-12:00	Photon beam dose calculations	ITD	Handbook	D1:03 (Efterladaren)
		Thursday	24.09	09:00-12:00	Treatment planning exercises on conventional RT	KK		
	Friday	25.09	09:00-12:00	Treatment planning exercises on conventional RT - cont	KK			

40	Monday	28.09	13:00-16:00	Inverse planning and IMRT	IT-D		MSF Library
	Tuesday	29.09	09:00-12:00	IMRT planning – practical aspects	FVN		MSF Library
	Wednesday	30.09	10:00-11:30	Imaging for treatment planning	FVN		MSF Library
			13:00-16:00	Treatment planning exercises on IMRT	FVN		D1:03 (Efterladaren)
	Thursday	01.10	13:30-15:30	Special RT treatment modalities: TBI, IORT	EO		TBD
			16:00-18:00	IMRT verification group GROUP 1	MAG, FVN		G3 (Reception)
41	Friday	02.10	16:00-18:00	IMRT verification group GROUP 2	MAG, FVN		G3 (Reception)
	External radiotherapy: treatment modalities						
	Monday	05.10	09:00-12:00	IGRT	FVN, MF		
	Tuesday	06.10	09:30-12:00	Stereotactic RT with GammaKnife	PB	Handbook	MSF Library
	Wednesday	07.10	09:00-12:00	SBRT	KK		
			13:00-16:00	Problem based learning - Case study 1 (Session 1)	FVN		D1:03 (Efterladaren)
42	Thursday	08.10	13:00-16:00	Problem based learning - Case study 1 (Session 2)	FVN		D1:03 (Efterladaren)
	Friday	09.10	09:00-12:00	Adaptive RT	IT-D		MSF Library
	RT with protons, neutrons and light ions						
	Monday	12.10	09:00-12:00	RT with protons	AD	Handbook	
			13:00-16:00	RT with light ions	AD		
	Tuesday	13.10	09:30-12:30	Neutron Therapy and BNCT	ML		CCK Lecture hall
43	Wednesday	14.10	09:00-12:00	Problem based learning - Case study 2 (Session 1)	FVN		
	Thursday	15.10	09:00-12:00	Problem based learning - Case study 2 (Session 2)	FVN		
	Friday	16.10	16:00-18:00	Visit to Skandion Clinic, Uppsala			
	Acceptance, commissioning, QA and QC						
	Monday	19.10	09:00-12:00	Introduction to commissioning, QA and QC in RT	IT-D		
	Tuesday	20.10	09:00-12:00	Acceptance tests and commissioning measurements	MAG		
44	Wednesday	21.10	09:00-12:00	Practical quality assurance and quality control	MAG		CCK Lecture hall
	Thursday	22.10	09:00-12:00	Risk analysis and safety culture	MAG		
	Friday	23.10	10:00-12:00	Failure Modes and Effects Analysis (FMEA) exercise	MAG		
	Brachytherapy						
	Monday	26.10	09:00-10:00	Introduction to BT	SD		Bo Nilsson Lecture room
			10:00-11:00	Treatment technique: HDR Gynaecology	SD		
			11:00-12:00	Treatment technique: HDR prostate	AR		
	Tuesday	27.10	13:15-14:15	Demo Oncentra Gynaecology	SD		NKS
			14:15-15:15	Demo Vitesse Prostate	AR		
	Wednesday	28.10	10:00-11:00	Source strength. Calibration	ÅCT		Bo Nilsson Lecture room
			11:00-12:00	Dose calculation for TPS, TG43 and more	ÅCT		
			13:15-14:45	Lab exercise - source calibration GROUP 1	ÅCT		

	Thursday	29.10	14:45-16:15	Lab exercise - source calibration GROUP 2	ÅCT	Bo Nilsson Lecture room
			09:00-10:30	Experimental BT	ÅCT	
	Friday	30.10	10:45-11:45	QA in BT	ÅCT/SB	
			10:00-11:00	Treatment technique: H&N, eye	SD	
			11:00-12:00	Calculation exercises	ÅCT	
45	Radiation protection, ethical and legal issues					
Monday	02.11	09:00-10:00	Radiation protection: calculation of shielding	MAG	CCK Lecture hall	
		10:00-12:00	Ethics in RT	MA1		
	Clinical Radiobiology					
Tuesday	03.11	13:00-15:00	Time, dose and fractionation in RT	EKL	Hall	MSF Library
		15:00-16:00	Calculation exercises	EKL		
Wednesday	04.11	10:00-12:00	Tumour oxygenation - clinical aspects	EKL		
		13:00-15:00	Seminar: Combined therapies	EKL		
Thursday	05.11	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		
		13:00-16:00	Problem based learning - Case study 3 (Session 1)	IT-D		
Friday	06.11	09:00-10:30	Patient re-irradiation	IT-D	Computer room	
		10:30-12:00	Problem based learning - Case study 3 (Session 2)			
46	Monday	09.11	09:00-10:30	Radiosurgery - radiobiological aspects	IT-D	Computer room
			10:30-12:00	Brachytherapy - radiobiological aspects	IT-D	
			13:00-16:00	Problem based learning - Case study 4 (Session 1)	IT-D	
Tuesday	10.11	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 2)	IT-D		
Wednesday	11.11	09:00-11:00	Risk of secondary cancer after radiotherapy	IT-D		
		11:00-12:00	Active Learning exercise - Session 1	IT-D		
Thursday	12.11	10:00-12:00	Seminar: Emerging treatment techniques and modalities	IT-D		
Friday	13.11	09:00-11:00	Sustainability in Radiotherapy	IT-D		
		11:00-12:00	Fractionation and the carbon footprint of RT	IT-D		
47	AI in Radiotherapy					
Monday	16.11	09:00-12:00	Lecture 1	MA2	Computer room	
		13:00-16:00	Active Learning exercise - Session 2	IT-D	MSF Library	
Tuesday	17.11	09:00-12:00	Lecture 2	MA2	Computer room	
Wednesday	18.11	09:00-12:00	Lecture 3	MA2		
		13:00-16:00	Active Learning exercise - Session 3	IT-D	MSF Library	

48	Thursday	19.11	09:00-12:00	Lecture 4	MA2	Computer room
	Friday	20.11	09:00-12:00	Lecture 5	MA2	
	Monday	23.11	09:00-10:00	Active Learning exercise - Session 4	IT-D	MSF Library
			10:00-12:00	Discussions	IT-D	
	Friday	27.11	09:00-14:00	EXAMINATION	MSF Library	

Lecturers:

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 Børnedal	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	Professor, Uppsala University, Medical Physicist, Skandion Clinic, Uppsala
MF	Marianne Falk	Medical Physicist, PhD, Karolinska Universitetssjukhuset, Stockholm
MAG	Mohammed Ali Ghazal	Medical Physicist, PhD, 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
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

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