Physics for Radiology Residents

Lectures: 12:00 to 1:00 PM 5 Days a Week every Monday, thru Friday,

Location: 1022 WIMR (Wisconsin Institutes for Medical Research)
except for May 11 in 1110 WIMR and Sept. 2 thru 10 in 1173 WIMR

Recommended Texts *(available at University Bookstore in the Health Sciences Learning Center):*

The Essential Physics of Medical Imaging, 2nd Edition **by JT Bushberg et al** *(1st listed chapter references)*

Review of Radiological Physics , 2nd Edition **by W Huda** *(2nd listed ch. & section references in parenthesis)*

Another Useful Text *but with some minor errors and a completely different order and way of covering the material:*

Physics of Radiology 2nd Edition **by AB Wolbarst**

I Lectures

1	*Mon*	*May 10*	Ch 1		Introduction, Course Objectives and Overview	F. Ranallo
2	*Tues*	*May 11*	App A, Ch 1, 2.1	(Ch 1 I, III)	Basic Physics Review & Characteristics of Radiation I	F. Ranallo
3	*Wed*	*May 12*			Basic Physics Review & Characteristics of Radiation II	F. Ranallo
4	*Thur*	*May 13*	Ch 2	(Ch 1 II, IV)	Structure of the Atom and the Nucleus I	F. Ranallo
5	*Fri*	*May 14*			Structure of the Atom and the Nucleus II	F. Ranallo
6	*Mon*	*May 17*			Interaction of Radiation w Matter; Rad Quantities & Units I	F. Ranallo
7	*Tues*	*May 18*	Ch 3	(Ch 3, Ch.5 V)	Interaction of Radiation w Matter; Rad Quantities & Units II	F. Ranallo
8	*Wed*	*May 19*			Interaction of Radiation w Matter; Rad Quantities & Units III	F. Ranallo
9	*Thur*	*May 20*	Ch 5	(Ch 2)	Interaction of Radiation w Matter; Rad Quantities & Units IV	F. Ranallo
	Fri	*May 21*			*Designated Furlough Day – Campus Closed - No Class*	
10	*Mon*	*May 24*	Ch. 23	(Ch 10)	Radiation Protection	J. Vetter
11	*Tues*	*May 25*	Ch. 24	(Ch 9 VI: 10)	Radiation Dosimetry	J. Vetter
12	*Wed*	*May 26*	Ch. 25	(Ch 10)	Radiation Biology I	J. Vetter
13	*Thur*	*May 27*	Ch. 25	(Ch 10)	Radiation Biology II	J. Vetter
14	*Fri*	*May 28*	Ch 18	(Ch 1 IV,V: 9 VI)	Radioactivity and Nuclear Transformation	J. Vetter
	Mon	*May 31*			*Memorial Day Observed - No Class*	
15	*Tues*	*June 1*	Ch 19	(Ch 9 I)	Radionuclide Production and Radiopharmaceuticals	J. Vetter
16	*Wed*	*June 2*	Ch 20	(Ch 3 IV, V)	Radiation Detection and Measurement	J. Vetter
	Thur	*June 3*			*Resident Reseach Day - No Class*	
17	*Fri*	*June 4*	Ch 20	(Ch 3 IV, V)	Radionuclide Dosimetry	J. Vetter
18	*Mon*	*June 7*	Ch 21-22	(Ch 9 II,III,IV)	Nuclear Imaging I	J. Vetter
19	*Tues*	*June 8*			Nuclear Imaging II	J. Vetter
20	*Wed*	*June 9*			Nuclear Imaging III and Review	J. Vetter
21	*Thur*	*June 10*			*Review Session*	J. Vetter
22	*Fri*	*June 11*			*Review Session*	J. Vetter
23	*Mon*	*June 14*		Ch 5 (Ch 2)	Generation and Control of X-rays: Interaction of Electrons,	F. Ranallo
24	*Tues*	*June 15*			with Matter, X-Ray Production, Tubes, & Rating Charts,	F. Ranallo
25	*Wed*	*June 16*			Filtration, Collimation, X-Ray Generators & Electronic	F. Ranallo
26	*Thur*	*June 17*			Fundamentals, Technique Factors & Patient Attenuation	F. Ranallo
27	*Fri*	*June 18*			*Review Session*	F. Ranallo
28	*Mon*	*June 21*			*Review Session*	F. Ranallo
29	*Tues*	*June 22*	Ch 6.2, 10	(Ch 5 I-IV)	Image Quality I	F. Ranallo
30	*Wed*	*June 23*			Image Quality II	F. Ranallo
31	*Thur*	*June 24*			Image Quality III	F. Ranallo
32	*Fri*	*June 25*	Ch 6.8, 5.6	(Ch 5 II)	Antiscatter Grids and Phototimers	F. Ranallo

33	*Mon*	*June 28*	Ch 6, 7	(Ch 4 II; 5 I)	Image Receptors: Properties of Film,	F. Ranallo
34	*Tues*	*June 29*			Screen-Film, Processors,	F. Ranallo
35	*Wed*	*June 30*	Ch 11	(Ch 6 II, III)	Digital Image Receptors:	F. Ranallo
36	*Thur*	*July 1*			CR and Flat Panels	F. Ranallo
37	*Fri*	*July 2*			*Review Session*	F. Ranallo
	Mon	*July 5*			*Independence Day Observed – No Class*	
38	*Tues*	*July 6*			Mammography I	J. Vetter
39	*Wed*	*July 7*			Mammography II	J. Vetter
40	*Thur*	*July 8*			Mammography III	J. Vetter
41	*Fri*	*July 9*	Ch 4, 17	(Ch 6 I, V)	Computers in Medical Imaging, PACS, & Teleradiology	W. Peppler
42	*Mon*	*July 12*	Ch 4, 17	(Ch 6 I, V)	Computers in Medical Imaging, PACS, & Teleradiology	W. Peppler
43	*Tues*	*July 13*			ROC Analysis	W. Peppler
44	*Wed*	*July 14*	Ch 9	(Ch 4 VI, 6 IV)	Fluoroscopy I	M. Van Lysel
45	*Thur*	*July 15*			Fluoroscopy II	M. Van Lysel
46	*Fri*	*July 16*	Ch 12.3-4	(Ch 6 IV)	Digital Subtraction Angiography	M. Van Lysel
47	*Mon*	*July 19*	Ch 14-15	(Ch 12)	MRI I: Overview	F. Korosec
48	*Tues*	*July 20*			MRI II: Basic Physics - I	F. Korosec
49	*Wed*	*July 21*			MRI III: Basic Physics - II	F. Korosec
50	*Thur*	*July 22*			MRI IV: Image Formation	F. Korosec
51	*Fri*	*July 23*			MRI V: Imaging Sequences I	F. Korosec
52	*Mon*	*July 26*			MRI VI: Imaging Sequences II	F. Korosec
53	*Tues*	*July 27*			MRI VII: Imaging Options & their Effects on Image Quality	F. Korosec
54	*Wed*	*July 28*			MRI VIII: Image Artifacts and Remedies	F. Korosec
55	*Thur*	*July 29*			MRI IX: Safety and Screening	F. Korosec
56	*Fri*	*July 30*			MRI X: Question and Answer Session	F. Korosec
57	*Mon*	*Aug 2*			*Review Session*	
58	*Tues*	*Aug 3*	Ch 13	(Ch 8)	Computed Tomography I	F. Ranallo
59	*Wed*	*Aug 4*			Computed Tomography II	F. Ranallo
60	*Thur*	*Aug 5*			Computed Tomography III	F. Ranallo
61	*Fri*	*Aug 6*			Computed Tomography IV	F. Ranallo
	Mon	*Aug 9*			*Noon Radiology Seminar Speaker - No Class*	
62	*Tues*	*Aug 10*			Computed Tomography V	F. Ranallo
63	*Wed*	*Aug 11*			Image Artifacts	F. Ranallo
64	*Thur*	*Aug 12*			*Review Session*	F. Ranallo
65	*Fri*	*Aug 13*	Ch 16	(Ch 11)	Ultrasound Imaging I	J. Zagzebski
66	*Mon*	*Aug 16*			Ultrasound Imaging II	J. Zagzebski
67	*Tues*	*Aug 17*			Ultrasound Imaging III	J. Zagzebski
68	*Wed*	*Aug 18*			Ultrasound Imaging IV	J. Zagzebski

II Practice Radiological Physics Exam *8:30 AM – 12:00 PM* - 1022 WIMR

Thurs Aug 19 **RAPHEX Exam** ..... F. Ranallo

II Annual Review for all Residents & Faculty (including incoming Residents):

Fri July 9 **Basics of Radiation & Radiation Safety** ..... F. Ranallo

III Introduction to Imaging Equipment for incoming residents – *12:00 – 1:00 PM*

(Classes 1 & 2 meet in 1190 WIMR; Class 3 meets by the E elevator lobby on the 3rd floor of CSC):

1	*Tues*	*July 6*	Equipment Operation, Radiation Safety, and Image Quality for incoming Residents - I	F. Ranallo
2	*Wed*	*July 7*	Equipment Operation, Radiation Safety, and Image Quality for incoming Residents - I	F. Ranallo
3	*Thur*	*July 8*	Equipment Operation, Radiation Safety, and Image Quality for incoming Residents - II	F. Ranallo

IV Resident ABR Exam Review Sessions

1	*Fri*	*Aug 20*	Board Recall Questions – Open Questions – Review	F. Ranallo
2	*Mon*	*Aug 23*	Board Recall Questions – Open Questions – Review	F. Ranallo
3	*Tues*	*Aug 24*	Board Recall Questions – Open Questions – Review	F. Ranallo
4	*Wed*	*Aug 25*	Board Recall Questions – Open Questions – Review	F. Ranallo
5	*Thur*	*Aug 26*	Board Recall Questions – Open Questions – Review	F. Ranallo
6	*Fri*	*Aug 27*	Board Recall Questions – Open Questions – Review	F. Ranallo
7	*Mon*	*Aug 30*	Board Recall Questions – Open Questions – Review	F. Ranallo
8	*Tue*	*Aug 31*	Board Recall Questions – Open Questions – Review	F. Ranallo
9	*Wed*	*Sept 1*	Board Recall Questions – Open Questions – Review	F. Ranallo
10	*Thur*	*Sept 2*	Board Recall Questions – Open Questions – Review	F. Ranallo
11	*Fri*	*Sept 3*	Board Recall Questions – Open Questions – Review	F. Ranallo
	Mon	*Sept 6*	*Labor Day Observed - No Class*	
12	*Tue*	*Sept 7*	Board Recall Questions – Open Questions – Review	F. Ranallo
13	*Wed*	*Sept 8*	Board Recall Questions – Open Questions – Review	F. Ranallo

Additional review sessions will be arranged at the request of the residents.

The ABR written boards (diagnostic and physics) will occur on Thursday, September 9.

Course Faculty	**Phone Numbers**
Frank Ranallo, Ph.D.	263-5713
John Vetter, Ph.D.	262-8780
Frank Korosec, Ph.D.	265-5588
James Zagzebski, Ph.D.	265-4929
Michael Van Lysel, Ph.D.	263-9650
Walter Peppler, Ph.D.	263-3440
David Kim, M.D. (Residency Program Director)	262-7932

Any questions concerning this course can be directed to Frank Ranallo, Ph.D.