Physics 544, Radiobiology Syllabus Winter 2014

Location: VIC room 1603

Time: 10:00 – 11:30 am, Mondays and Thursdays (except Student Presentations)

Course Instructors	Location	E-mail	Phone number
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Week	Date	Instructor	Assign.	Lecture number, Chapter & Title	
1	Jan 6	PSB	A1 given	1	Ch1; Introduction: the significance of radiobiology and radiotherapy for cancer treatment
1	Jan 9	PSB		2	Ch2; Irradiation-induced damage and the DNA damage response
2	Jan 13	PSB		3	Ch3; Cell death after irradiation: how, when and why cells die
2	Jan 16	PSB		4	Ch4; Quantifying cell kill and cell survival
3	Jan 20	PSB		5	Ch6; Linear energy transfer and relative biological effectiveness
3	Jan 23	PSB		6	Ch7; Tumor growth and response to radiation
4	Jan 27	PSB		7	Ch5; Dose-response to radiation
4	Jan 30	MH	A1 due	8	Ch13; Pathogenesis of normal-tissue side-effects
5	Feb 3	MH	A2 given	9	Ch14; The volume effect in radiotherapy
5	Feb 6	MH		10	Total-body irradiation and radiation carcinogenesis (Hall; Ch8,10)
	Feb 10				Reading Break
	Feb 13				Reading Break
7	Feb 17	MH		11	Fetal Irradiation & Hereditary Effects (Hall; Ch* & *)
7	Feb 20	MH	A3 given	12	Ch8; Fractionation: the linear-quadratic approach
8	Feb 24	MH		14	Ch10; Modified fractionation
8	Feb 27	**ALL**	A2 due	**13**	**Student Presentations* 9:30-11:00 am**
9	Mar 3	PSB		15	Ch11; Time factors in normal-tissue responses to irradiation; Repopulation
9	Mar 6	PSB		16	Ch12; The dose-rate effect; Brachytherapy
10	Mar 10	IG		17	Ch9; The linear-quadratic approach in clinical practice
10	Mar 13	IG		18	Radiobiological modeling in radiotherapy (Handout)
11	Mar 17	IG	A3 due	19	Ch15; Oxygen effect and fractionated RT(Handout; 8.4-8.7)
11	Mar 20	IG	A4 given	20	Ch17; Therapeutic approaches to tumour hypoxia
12	Mar 24	IG		21	Ch18; Combined chemotherapy and radiation (Handout; 13.1-13.5)
12	Mar 27	IG		22	Ch21; Molecular-targeted agents for enhancing tumour response
13	Mar 31	IG		23	Ch22; Normal tissues biological response modifiers
13	Apr 3	MH	A4 due	24	Extra lecture : Current issues

Marking Scheme

	Mark	Comments
Participation	58 %	Approximately 2.5 % x 23 sessions, see below
Assignments	28 %	7 % x 4 assignments
Presentation	14 %	On approved topic, see below

Participation

The "in-class" component of the course is organized as a discussion session. Before each session you will be assigned reading material relevant for the session. You will also be given sample questions that may be asked of you in the discussion session. You will be responsible for understanding all the assigned reading. During each session you will be called upon to answer questions / explain concepts / draw diagrams of equipment etc. from the assigned sections for that given week. The questions asked by the instructors will form the "seeds" for the discussion sessions.

Each discussion session is worth approximately 2.5% (i.e. 58% / 23 sessions). Marking for each session will be undertaken by the instructor leading the discussion session. Marks will be based on your level of preparation for each session, comprehension of material, and initiative in the session by way of supplementary comments and/or questions.

Assignments

There will be 4 assignments covering various topics in radiobiology. Each assignment is worth 7% of the total mark. Assignments will be provided by each instructor.

Presentation

A presentation involving current topics in radiobiology will be required from each student. All presentations will be held on TBA . A list of topics for presentations will be provided at the beginning of the semester. You should make a choice of your presentation topic within the first four weeks of the course. Let one of the instructors know your choice of topic before you start preparing. You are free to suggest topics, but the topic should not focus on your graduate work or material previously presented. Presentations are 20 minutes in length, with 15 minutes for presentation and 5 minutes for questioning/discussion.

The presentation mark (14 %) will be based on the completeness and accuracy of the content, the breadth and scope of the literature review, the clarity in oral and visual (slides) presentation, timeliness, and the quality of responses to questions posed by the instructors and students.

Course Textbook

Basic Clinical Radiobiology

Ed: Michael Joiner & Albert van der Kogel, 4th Edition, Hodder Arnold, London UK

Please order it for yourself (ex: Amazon). An additional copy is in the physics library.

There will also be other reading material such as handouts and material from other texts, such as:

Radiobiology for the Radiologist

Eric Hall, 5th (2000) or 6th edition, Lippincott Williams & Wilkins, Philadelphia PA

Another other useful (but not required) textbook is:

Applied Radiobiology and Bioeffect Planning

David R. Wigg (2000), Medical Physics Publishing, Madison WI