

**WAYNE STATE UNIVERSITY
DEPARTMENT OF ONCOLOGY
CANCER BIOLOGY PROGRAM**

**CB7300 Clinical Radiobiology
Spring/Summer Semester 2017**

- TIME:** Usually 9:30 a.m. – 11:00 a.m. Thursdays
- LOCATION:** Large Conference Room, Radiation Oncology Center, Harper Hospital
- INSTRUCTOR:** Michael C. Joiner, Ph.D., Professor, Radiation Oncology, WSU
Phone: (313) 576-8344; Email: joinerm@wayne.edu
- OFFICE HOURS:** By appointment
- SUGGESTED READING:** *Basic Clinical Radiobiology*, Michael Joiner & Albert van der Kogel
4th Edition, ISBN 978-0-340-92966-7
Radiobiology for the Radiologist, Eric J. Hall & Amato J. Giaccia
7th Edition, ISBN 978-1-608-31193-4

COURSE OVERVIEW

The biological effects of ionizing radiation on living tissue, including specific cell and tissue radiosensitivity, dose-response relationships, radiation syndromes and related effects, will be outlined in this course. Radiobiology research and clinical cancer radiotherapy will be emphasized.

LEARNING OBJECTIVES

At the completion of this course, students should be able to:

- a) describe the fundamental radiochemical and cytogenetic mechanisms by which radiation causes cell death
- b) clearly explain how to measure cell death and the mathematical models used to calculate cell survival
- c) discuss the relative contributions of the different physiological factors which modify overall radiation response
- d) understand the importance of radiation effects on normal tissues as well as tumors in radiotherapy
- e) describe the different types of radiation used to treat cancer and what are their relative advantages and disadvantages
- f) discuss the risk of radiation in causing unintended second cancers and genetic changes which could be transmitted to offspring

METHOD OF INSTRUCTION

Lecture / lecture discussion

GRADING

The course grade will be determined according to the following:

Test 1	50%
Test 2	50%

The instructor will utilize the grading guidelines below in the determination of the final course grade. However, adjustments in the grade may be made due to the quality of the student's class participation and attendance record.

A	=	4.00	=	100 – 90%	C	=	2.00	=	73.3 – 70.0%
A-	=	3.67	=	89.9 – 86.7%	C-	=	1.67	=	69.9 – 66.7%
B+	=	3.33	=	86.6 – 83.4%	D+	=	1.33	=	66.6 – 63.4%
B	=	3.00	=	83.3 – 80.0%	D	=	1.00	=	63.3 – 60.0%
B-	=	2.67	=	79.9 – 76.7%	D-	=	0.67	=	59.9 – 56.7%
C+	=	2.33	=	76.6 – 73.4%	E	=	0.00	=	Below 56.7%

The instructor reserves the right to scale the grades at the end of the term. A lower course grade will not be assigned based on such scaling. Final grades will be rounded to the nearest whole number. A grade of "I" (Incomplete) will be given only in the most extraordinary circumstances.

EXAMINATION POLICY

All tests and exams are to be taken. No make-up tests or exams will be given. In case of illness or a legitimate emergency, the grades from Test 1 or Test 2 can be replaced by the grade received on an optional paper. The instructor must approve the topic and will assign a due date.

WITHDRAWAL POLICY

In the first two weeks of the (full) term, students can drop this class and receive 100% tuition and course fee cancellation. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Pipeline/Academica. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. No withdrawals can be initiated after **February 24th, 2017**. Students enrolled at February 25th and beyond will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step. More information on this can be found at: <http://reg.wayne.edu/pdf-policies/students.pdf>

ACADEMIC DISHONESTY

Students must not copy material from exams written by other students. You may not consult any references or written material during exams unless you are explicitly allowed to do so (in writing). Following exam grading, students may see their exam papers but will not be allowed to retain them and they must be returned to the Instructor. You are asked not to divulge exam questions to future students. This is for their benefit and yours. You share in the responsibility we have as a graduate program to assure that trainees have the ability to appropriately treat patients in a setting which presents grave potential consequences. This of course also implies that you should not attempt to solicit such material from former students. Any acts of academic dishonesty shall be dealt with according to departmental and University policies.

APPEALS POLICY:

Details of appeals procedures can be obtained from Dr. Larry Matherly, Director of the Cancer Biology Graduate Program.

DISABILITY

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. Once you have your accommodations in place, the Instructor will be glad to meet with you privately during office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

RELIGIOUS HOLIDAYS

(from the online Academic Calendar): Because of the extraordinary variety of religious affiliations of the University student body and staff, the Academic Calendar makes no provisions for religious holidays. However, it is University policy to respect the faith and religious obligations of the individual. Students with classes or examinations that conflict with their religious observances are expected to notify their instructors well in advance so that mutually agreeable alternatives may be worked out.

STUDENT SERVICES

The Academic Success Center (1600 Undergraduate Library) assists students with content in select courses and in strengthening study skills. Visit www.success.wayne.edu for schedules and information on study skills workshops, tutoring and supplemental instruction (primarily in 1000 and 2000 level courses). The Writing Center is located on the 2nd floor of the Undergraduate Library and provides individual tutoring consultations free of charge. Visit <http://www.clas.wayne.edu/writing/> to obtain information on tutors, appointments, and the type of help they can provide.

READING ASSIGNMENTS

Students are recommended to read the assignments indicated on the following class schedule before the dates shown.

SCHEDULE

The course takes place in the Winter semester, 2017. Note that the schedule is subject to change in the event of necessary changes in the Instructor's schedule or university closure due to inclement weather.

DATE	LECTURE #	TOPICS	READING Chapter #s
(9:30am)	1	Physical and chemical interactions. Chromosome aberrations. Effect on DNA, DNA as the target.	<i>Joiner:</i> Ch. 1 <i>Hall:</i> Chs. 1, 2
(9:30am)	2	Cell survival curves, Target and LQ models. Dose response relationships in radiotherapy. Clinical manifestations of normal tissue damage.	<i>Joiner:</i> Chs. 4, 5 <i>Hall:</i> Chs. 2, 3, 19, 20
(9:30am)	3	Dose and clinical response for normal tissues. Volume effects.	<i>Joiner:</i> Chs. 11, 13, 14 <i>Hall:</i> Ch. 19, 20
(9:30am)	4	Radiobiology of tumors. Model tumor systems.	<i>Joiner:</i> Ch. 7 <i>Hall:</i> Chs. 21, 22
(9:30am)	TEST 1		
(9:30am)	5	Time, dose and fractionation in radiotherapy.	<i>Joiner:</i> Chs. 8, 9, 10 <i>Hall:</i> Ch. 23
(9:30am)	6	Oxygen effect in radiotherapy.	<i>Joiner:</i> Chs. 15, 16, 17 <i>Hall:</i> Chs. 6, 26
(9:30am)	7	Effect of Linear Energy Transfer. Particle beams in radiotherapy: protons, neutrons, light ions.	<i>Joiner:</i> Chs. 6, 24 <i>Hall:</i> Chs. 7, 25

DATE	LECTURE #	TOPICS	READING Chapter #s
(9:30am)		SPRING BREAK	
(9:30am)	8	Acute effects of total body irradiation. Effects of radiation on the embryo and fetus. Radiation carcinogenesis. Radiation genetics.	<i>Joiner:</i> Ch. 25 <i>Hall:</i> Chs. 8, 10, 11, 12
(9:30am)		TEST 2	

Michael Joiner
September 2016