

Fall 2023

Radiation Biology

ENU 5626; Section 1C99; 3 Credits

CLASS MEETING INFO

1:30 – 2:45; Tuesday & Thursday
August 23 – December 15
Communicore Building Room C2-33

INSTRUCTOR

Izabella Barreto, PhD; Izabella.Barreto@radiology.ufl.edu; (352) 265-0680 x 44381
BC Schwarz, PhD; schwbc@radiology.ufl.edu; (352) 294-8313
Office Hours: By appointment

DESCRIPTION

Effects of radiation on biological molecules, cells, and man including cancer and mutagenesis; use of radiation in treatment of disease.

PRE-REQUISITES

Prerequisite: one year each of college biology, chemistry, and physics; permission of instructor.

OBJECTIVES

To provide a fundamental knowledge of the mechanisms and biological responses of human beings to ionizing and non-ionizing radiations through the study of the effects of radiation on biological molecules, cells, and man including cancer and mutagenesis. The course will develop the ability to make objective decisions regarding the relative risks and benefits of radiation use in a variety of applications.

REQUIRED TEXTBOOK

Radiobiology for the Radiologist, Hall and Giaccia, 2012 – 7th Edition, 2012

EVALUATION OF GRADES

Assignment	Percentage of Final Grade
Homework	10%
Presentation	15%
Exam 1	25%
Exam 2	25%
Exam 3	25%
	Total: 100%

GRADING POLICY

Percent	Grade
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
59 & below	E

More information on UF grading policy may be found at: <http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

COURSE SCHEDULE

	Date	Topic	Chapter	By
1	Th 8/24/23	Introduction to Radiation Biology	1, 7	IB
2	Tu 8/29/23	Radiation Interactions & LET	7	IB
3	Th 8/31/23	Cellular biology, Radiosensitivity in the Cell Cycle	2, 4	IB
4	Tu 9/5/23	Radiation damage to DNA & chromosomes	2, 3	IB
5	Th 9/7/23	Evaluating Chromosomal Damage	3	IB
6	Tu 9/12/23	Cell Survival Curves: Dose response relationships	3	IB
7	Th 9/14/23	Dose Quantities, Background Sources, Radiation Protection	17	TM
8	Tu 9/19/23	Factors that affect cell survival: Dose rate & oxygen effect	5, 6	IB
9	Th 9/21/23	Relative Biological Effectiveness	7	IB
	Tu 9/26/23	Exam 1 (Lectures 1-9)		
10	Th 9/28/23	Whole Body Acute Effects, Radioprotectors	8, 9	BS
11	Tu 10/3/23	Deterministic Effects of Radiation on Organs	20,13	BS
12	Th 10/5/23	Radiation carcinogenesis & cancer biology	10, 18	BS
13	Tu 10/10/23	Evidence for hereditary effects of radiation	11	BS
14	Th 10/12/23	Effects of radiation on the embryo and fetus	12	BS
15	Tu 10/17/23	Internal Distributions of Radionuclides (1)	15, 16	BS
16	Th 10/19/23	Internal Distributions of Radionuclides (2)	15, 16	BS
17	Tu 10/24/23	Effective Dose, Doses & Risks in Diagnostic Radiology & Nuclear Medicine	ICRP, 16	BS
	Th 10/26/23	Exam 2 (Lectures 10-17)		
18	Tu 10/31/23	Evidence for cancer risk modeling	BEIR 7	IB
19	Th 11/2/23	Calculating stochastic risks for site-specific cancers	BEIR 7	IB
20	Tu 11/7/23	Evidence for radiation hormesis & Assign student projects	BEIR 7	IB
21	Th 11/9/23	Cancer Biology, Effects in Therapy & Clinical Response Normal Tissues	18 - 20	BS
22	Tu 11/14/23	Radiation Therapy Treatment Fractionation & BED	23	BS
23	Th 11/16/23	<i>Alternative Therapies, Biological effects of non-ionizing radiation (1)</i>		BS
	Tu 11/21/23	<i>No Class (extra day if needed)</i>		
	Th 11/23/23	Thanksgiving (no classes)		
24	Tu 11/28/23	Biological effects of non-ionizing radiation (2)	25	BS
25	Th 11/30/23	Radiation Accidents	N/A	BS
	Tu 12/5/23	Exam 3 (Lectures 18-25)	14	
	Th 12/7/23	Final Presentations & Papers Due		

ATTENDANCE POLICY; CLASS EXPECTATIONS; MAKE-UP POLICY

Students are expected to attend each class period. Periods which may be missed should be brought to the attention of the Instructor as far in advance of the class period as possible. In the event of an unexcused absence, it is the student's responsibility to obtain and review the material that was covered during that class period. Excused absences must be consistent with university policies in the Graduate Catalog and require appropriate documentation:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>

Class distractions such as cell phones and pagers are unacceptable. Students will ensure that any such devices that are brought into the classroom will be turned off, or operated in a silent mode, during the class period.

Make-up assignments will only be considered for exceptional circumstances and will be implemented by the instructor on a case-by-case basis.

STUDENTS REQUIRING ACCOMMODATIONS

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565; <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

EVALUATIONS

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

UNIVERSITY HONESTY POLICY

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

SOFTWARE USE

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

STUDENT PRIVACY

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

CAMPUS RESOURCES

Health and Wellness

U Matter, We Care

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center

352-392-1575; <http://www.counseling.ufl.edu/cwc>

Sexual Assault Recovery Services (SARS)

352-392-1161; Student Health Care Center

University Police Department

352-392-1111 (or 911 for emergencies); <http://www.police.ufl.edu/>

Academic Resources

E-learning Technical Support

352-392-4357 (select option 2); learning-support@ufl.edu; <https://lss.at.ufl.edu/help.shtml>

Career Resource Center

Career assistance and counseling.

352-392-1601; Reitz Union; <https://www.crc.ufl.edu/>

Library Support

Various ways to receive assistance with respect to using the libraries or finding resources.

<http://cms.uflib.ufl.edu/ask>

Teaching Center

General study skills and tutoring.

352-392-2010 or 352-392-6420; Broward Hall; <https://teachingcenter.ufl.edu/>

Writing Studio

Help brainstorming, formatting, and writing papers.

352-846-1138; 302 Tigert Hall; <https://writing.ufl.edu/writing-studio/>

Student Complaints Campus

https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf

On-Line Students Complaints

<http://www.distance.ufl.edu/student-complaint-process>