

RAD 380
PHYSICS OF RADIATION THERAPY
BRANDON HIRSCH
FALL 2016

COURSE DEFINITION:

Includes a study of the physical principles and applications of radiation in therapy. Defines the nature of radiation, radioactivity, interactions with matter and different radiation therapy instrumentation. Review of basic radiation therapy principles for use in later courses.

COURSE OBJECTIVES:

1. Demonstrate an understanding of the basic mathematical functions and their application to radiation therapy.
2. Demonstrate an understanding of the different types of radiation production.
3. Demonstrate an understanding of theory and principles of operation of treatment units and imaging units.
4. Understand and calculate radiation attenuation and decay.
5. Demonstrate an understanding of the different types of radiation detectors.

COURSE OUTLINE:

1. Math review.
2. Characteristics of radiation.
3. Radiation interactions with matter.
4. Linear accelerator components.
5. Attenuation coefficients and half-life.
6. Radiation detection and measurement.

COURSE REQUIREMENTS:

Purchase McDermott Radiation Physics text, attend all lectures, and complete required examinations and quizzes. Purchase a TI-30XA scientific calculator.

ATTENDANCE POLICY:

The instructor must be notified prior to class if you are going to be absent. One percent of total grade will be deducted for every class missed. Ten minutes late to a class counts as an absence.

MEANS OF STUDENT EVALUATION:

Grades will be determined by:

Grading Scale

1. Test Performance70% (700 PTS)	93 - 100 = A	930 – 1000	PTS
2. Quizzes/Homework.....30% (300 PTS)	85 - 92 = B	850-920	PTS
	77 - 84 = C	770-840	PTS
	70 - 76 = D	700-760	PTS
	0 - 69 = F	<690	PTS

Grade Calculation: all grades will be entered on D2L such that students can track their progress in optimal time. In total, there will be 1,000 points possible in the class. The total amount of test points will be 700 or 70% of the class, averaged over 4 exams (one of which includes a comprehensive final). The final is worth the same amount of points as any other exam. The total amount of quiz and homework points will collectively add up to 300 points or 30% of the class.

Homework Policy: Homework is due on predetermined dates at the start of class, and if not complete by then will be considered late and graded as is. No late work will be accepted at all.

Examination Policy: Students are not permitted to leave the classroom once examinations for tests and quizzes have been handed out. For using the restroom, please do so before the test starts. If a student does need to use the restroom for some reason they must submit the exam/quiz for grading beforehand and will not be allowed to resume work on that particular exam/quiz. The number of quizzes will vary, as I reserve the right to implement impromptu quizzes at any time in the class. In such cases as the adding a homework or quiz, they along with previous homework/quizzes will still collectively be worth 30% of the class.

PREREQUISITES: Instructor approval.

TEXTBOOKS:

- **Required:**
 - McDermott, P.N. (2010) The Physics & Technology of Radiation Therapy (1st ed.) Madison, WI: Medical Physics Publishing
- **Supplemental (Only if you want a secondary source, don't feel obligated):**
 - Khan, F.M. (2014). The Physics of Radiation Therapy (5th ed.). Baltimore, MD: Lippincott, Williams & Wilkins
 - Pawlicki, T., Schanderbeg, D.J., Starkschall, G. (2016) Hendee's Radiation Therapy Physics (4th ed.) Hoboken, NJ: John Wiley & Sons, Inc.
 - Bushong, S.C. (2013). Radiologic Science for Technologists: Physics, Biology & Protection (10th ed.) St. Louis, MO: Elsevier Mosby
 - Cherry, S.R., Sorenson, J.A. (2012) Physics in Nuclear Medicine (4th ed.) Philadelphia, PA: Elsevier Saunders

CLASSROOM BEHAVIOR:

The classroom is a "safe" environment for students. The focus will be on learning. Causing disruptions, harassment of other students, foul language, disrespect for others, or entertaining at someone else's expense will not be tolerated. For a detailed explanation of Student Code, consult "Student Conduct Code" found in Important information for SIUC students, faculty, and staff. All other rules of the code must be followed. The Student Conduct Code is available at: <http://www.siuc.edu/~policies/policies/conduct.html>

Academic Honesty:

All students are expected to adhere to a strict code of academic honesty. Academic dishonesty will be addressed according to the "Policies and Procedures Applicable to Academic Dishonesty" as stated in the "Important Information for Students, Faculty, & Staff" booklet.

From the "Student Conduct Code", section II, article A:

Acts of Academic Dishonesty:

1. Plagiarism, representing the work of another as one's own work;
2. Preparing work for another that is to be used as that person's own work;
3. Cheating by any method or means;
4. Knowingly and willfully falsifying or manufacturing scientific or educational data and representing the same to be the result of scientific or scholarly experiment or research;
5. Knowingly furnishing false information to a university official relative to academic matters;
6. Soliciting, aiding, abetting, concealing, or attempting conduct in violation of this code.

Sanctions will be imposed for violations of this policy in accordance with the Student Conduct Code. A copy of the "Important Information for Students, Faculty & Staff" booklet can be obtained from the Office of the Vice Chancellor for Student Affairs, Mailcode 4308, Southern Illinois University, Carbondale, IL 62901-4308.

ADA Accommodations:

In keeping with the goal of the implementation of the Americans with Disabilities Act (ADA), all students for whom this act applies should notify the instructor no later than the second session of the course so that arrangements can be made for accommodations to meet your educational needs and maximize learning.

Emergency Procedures:

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on the BERT's website at www.bert.siu.edu, Department of Public Safety's website www.dps.siu.edu (disaster drop down) and in the Emergency Response Guidelines pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. **It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.** The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.

OFFICE HOURS:

Location: College of Applied Science and Arts – 120B

Tuesday: 12:00 p.m. – 3:00 p.m.

Thursday: 12:00 p.m.–3:00 p.m.

Friday: 8:00 a.m. – 9:00 a.m.

Also available immediately after class or by appointment.

COURSE CLASSROOM and TIME:

Room- ASA 11

Tuesday & Thursday: 3:00-5:00p.m. and Friday: 2:00-4:00p.m.

BEING PREPARED FOR CLASS

Students must be prepared for class by having all required textbooks available, reading required chapters, and having all assignments complete when entering the classroom.

SIU POLICY ON “INCOMPLETE” AS A COURSE GRADE

An INC assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments. An INC must be changed to a complete grade within a time period designated by the instructor but not to exceed one year from the close of the term in which the course was taken, or graduation whichever occurs first. Should the student fail to complete the course within the time period designated, not to exceed one year, or graduation, whichever comes first, the incomplete will be converted to a grade of F and the grade will be computed in the students grade point average. Students should not register for courses in which an INC has been assigned with the intent of changing the INC grade. Re-registration will not prevent the INC from being changed to an F.

MOBILE TECHNOLOGY POLICY

No mobile devices are allowed during class unless first Okayed by the instructor.

STATEMENT ON INCLUSIVE EXCELLENCE

SIU contains people from all walks of life, from many different cultures and sub-cultures, and representing all strata of society, nationalities, ethnicities, lifestyles, and affiliations. Learning from and working with people who differ from you is an important part of your education in this class, as well an essential preparation for your career.

STATEMENT ON ACADEMIC HONESTY/PLAGIARISM

As defined by the SIUC **Student Conduct Code**, acts of academic dishonesty include, but are not limited to:

1. **Plagiarizing** or representing the work of another as one's own work;
2. Preparing work for another that is to be used as that person's own work;
3. Cheating by any method or means;
4. Knowingly or willfully falsifying or manufacturing scientific or educational data and

representing the same to be the result of scientific or scholarly experiment or research;

5. Knowingly furnishing false information to a university official relative to academic matters;

6. Soliciting, aiding, abetting, concealing, or attempting acts of academic dishonesty.

RESOURCES FOR ADDITIONAL ACADEMIC HELP

Supplementary Assistance: With cooperation of SIU's Disability Support Services (DSS), each student who qualifies for reasonable supplementary assistance has the right to receive it. Students requesting supplementary assistance must first register with DSS in Woody Hall B-150, (453-5738) or <http://disabilityservices.siu.edu/>

Notice: If you have any type of special need(s) or disability for which require accommodations to promote learning in this class, please contact me as soon as possible. The Office of Disability Support Services (DDS) offers various support services and can help you with you with special accommodations. You may wish to contact DDS at 453-5738 or go to Room 150 at Woody Hall to verify your eligibility and options for accommodations related to your special need(s) or disability.

SIU EMAIL POLICY

Official SIU student Email Policy: <http://policies.siu.edu/policies/email.htm>

SIU Student Conduct Code: <http://policies.siu.edu/documents/StudentsConductCodeFINALMay32011.pdf>

SALUKI CARES

The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress-physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. To make a referral to Saluki Cares click, call or send: <http://salukicare.siu.edu/index.html>; (618) 453-5714. Or siucares@siu.edu