BRACHYTHERAPY
Syllabus, Schedule & Grading Scheme
Summer Semester 2018
UT-HSC Radiation Therapy Course MPHY 6190/8190

Brachytherapy is a 3 credit hours course designed for MSBS/Ph.D. students in radiation oncology physics track. It is divided into two sections of didactic and laboratory experiments. The aim of the didactic portion of the course is to familiarize students with principles of Brachytherapy, definitions, and methods, various implant techniques and treatment planning dosimetry as per AAPM -TG 43U, as well as hand calculation of dose using actual patient data. In laboratory portion of the course students will gain hands on experience in safe handling of radioactive material in hot lab, radioactive surveys, determination of energy distribution and determination of unknown source strength using HVL concepts, etc..

Text Book: Brachytherapy Physics
AAPM Summer School, July 2005
Editors: B.R. Thomadsen, Mark Rivard, and Wayne Butler

Reference Text1: The Physics of Modern Brachytherapy for Oncology
Authors: Baltas, Sakelliou, and Zamboglou

Reference Text2: A Practical Manual of Brachytherapy
Authors: Pierquin & Marinello

Credit hrs: 3 credits (Lectures: Wednesdays 1:30 to 3:45 pm;
Lab hours: 2 hrs/week) G3

Prerequisite: consent of instructor

Instructors: E. Parsai, D. Shvydka, N. Sperling, C. Chen, & K. Reddy

Grading policy:

Lab write-ups	20 %
Mid-term Exam	40%
Final Exam	40%

Topic	Additional References	Instructor	Date
Brachytherapy principles, definitions, methods.	Chapter 1, text*; Power point handout.	EP	5-16
Physical properties & clinical use of radionuclides, source calibration, measurement of source strength. Review of TG-32	Chapters 3, 11-13 text Khan (357 - 397); Link/download TG-32	NS	5-23
Radiobiological aspects of brachytherapy	Chapter 2, text Khan (357- 397)	DS	5-30
Quantitative dosimetry methods in Brachytherapy; Review of TG-43	Chapter 15 &16 Text; TG-43 protocol	EP	6-6
Mid-term Examination	Exam over first four sessions of the course	EP	6-13
Implantation techniques; dose specifications (ICRU 38)	Chapters 18-20; 26 text ICRU 38	CC/KR	6-20
Physical & biological aspects of HDR	Chapter 6, text; Nag's HDR Book Chapters 3-5 & 7	EP	6-27
Systems of implant Dosimetry, Computer Dosimetry & 3-D Treatment Planning.	Chapters 17, 21-23 text	EP	7-4
Quality assurance and regulatory issues	Chapters 5, 7; 23-24 text; TG-56 protocol	NS	7-11
Review	Review of the second half of the course	EP	7-18
Final Examination	Exam over the last four sessions	EP	7-25

*Text refers to Brachytherapy Physics text book, second edition; AAPM Summer School, July 2005

The laboratory experiments consist of the following four labs:

Lab Number	**Topic**	Instructor
1	a. Handling, survey counting and inventory of brachytherapy sources. b. Determine activity of a given unknown source using HVL measurement. c. Determine energy distribution of the same source	EP
2	Demonstrate 3D treatment planning of brachytherapy for the following cases: ➢ Cs-137 (LDR FSD using Pinnacle) ➢ Ir-192 (HDR FSD using Brachyvision) ➢ I-125 or Pd-103 (LDR using Variseed) Report: A Fletcher Suit Plan (Using the HDR Ir-192 source). A plan for prostate seed implant.	EP
3	a. Calibrate 2 different Cs-137 sources (with nominal activities of 5 and 15 mgRaEq) using a well chamber, and a Cutie-Pie ionization chamber. b. Generate an isodose response map for each of these sources using film and the RIT dosimetry software.	EP/ NS/DS
4	Follow a brachytherapy (HDR) patient and report steps on: a. Source localization and simulation procedures. b. Treatment plan. c. Radiation safety QA, NRC forms, etc.	EP

Lab reports are due one week after completion of each lab session.