Clinical Laboratory Rotation Course in Radiation Therapy Physics
Radiation Therapy PHYS 672A, Schedule #:22636
Fall 2014

Class Days: Every Mondays except when noted
Class Times: 4 PM
Class Location: Department of Physics
2466 1st avenue, Suite B,
San Diego, CA 92101

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Professor: George Mardirossian, PhD, DABR
Contact Information: 619-230-0400 x-2242
Office Hours Days: Monday
Office Hours: By appointment
Office Hours Location: Dept of Physics

Course Overview

Catalog Description: Skills to perform radiation therapy physics procedures.

This course provides hand on and practical procedures involved in Medical Physics radiation therapy environments. The class starts with an overview of the practicum and the reason of the procedure followed by actual demonstrations and performance of equipments/analytical tools involved in the procedure.

Student Learning Outcomes:

Students get to learn about general radiation therapy physics tasks anticipated during clinical working environment. They will:

1) be able to identify linear accelerator hardware and independently perform the monthly checks of the linear accelerator; 2) be familiar with computerized treatment planning and will be capable of planning for whole brain, 3 field esophagus, 4 field pelvis and 7 field Prostate IMRT; (3) fluent in the TG-51 protocol: theory and practical calibration of the photon and electron beam; and (4) understand IMRT procedures and associated Quality Control procedures.

Student learning outcomes will be evaluated by quizzes, oral exams as well as the laboratory reports. The oral exam is modeled to test both the practical and theoretical aspects of radiation therapy physics.

Enrollment Information

- Prerequisites: Physics 670A
- Adding/Dropping Procedures set by SDSU policies.

Course Materials

Faiz Khan (3rd Edition), SDSU Library and Genesis Healthcare Partners Library.
Text books and handout materials will be electronically emailed by Professor.

Course Structure and Conduct

PHYS 672A. Radiation Therapy Physics Laboratory (3)
One lecture and six hours of laboratory.
Prerequisite: Physics 670A.

Skills to perform radiation therapy physics procedures.

Classes start by a traditional Lecture followed by lab workshop. The workshop is a group activity designed to provide hand skill on procedures in which students take turns in the process.

Course Assessment and Grading

Please explain how the course will be assessed and graded by including, but not limited to:

- Quizzes are taken every other week.
Students is assessed by absence, participation and performance during the lab workshop.

Final exam is oral presentation of all materials provided in the class between the student and the instructor(s)

Grading: 30% Quizzes, 20% Lab work performance, 50% Final

**Student Disability Services**
If you believe you will need accommodations for this class, it is your responsibility to contact me and Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Disability Services. Your cooperation is appreciated.

**Other Course Policies**

- Class 1; introduction to course and lab area
- Class 2;
  1. Linear accelerator hardware components
  2. Operating procedures
  3. Emergency procedures
- Class 3;
  1. Review of Task Group
  2. TG-142
  3. Field size accuracy and rotational Isocentricity
  4. Light vs. radiation field
- Class 4;
  1. Measurement of flatness – 6 and 10 MV x rays
  2. Measurement of symmetry – 6 and 10 MV x rays
  3. Measurement of relative output – Sc and Sp
  4. Measurement of PDD (TG-51 beam quality)
  5. Measurement of TMR (beam penetration)
- Class 5;
  1. Calibration of photon beam- TG-51 protocol
  2. Calibration of electron beam – TG-51 protocol
- Class 6;
  1. Daily check of a linear accelerator
  2. Monthly checks of a linear accelerator
  3. Annual checks of a linear accelerator
- Class 7;
  1. Computerized treatment planning- 1
  2. AP/PA - 6 MV vs. 18 MV
  3. AP/PA – effect of field weighting
  4. Whole brain
  5. Wedge pair
- Class 8;
  1. Computerized treatment planning- 2
  2. 3 field esophagus
  3. 4 field pelvis
  4. 7 field Prostate IMRT
- Class 9;
  1. Brachytherapy; Physical and Clinical Aspects
  2. LDR vs. HDR
  3. Temporary implant
  4. Permanent implants
- Class 10;
  1. IMRT QA and testing
  2. Electronic devices
• Class 11;
  1. IMRT QA and testing
  2. Film dosimetry

• Class 12;
  1. Radiation Protection
  2. Shielding calculations
  3. Door design
  4. Radiation survey

• Class 13;
  1. Special procedures
  2. SRS
  3. SBRT
  4. TBI
  5. TSET

• Class 14;
  1. CyberKnife System characteristics, operation and QA
  2. Overall Review

• Class 15;
  1. Final Exam