RADT 63B Course Outline as of Fall 2012

CATALOG INFORMATION

Dept and Nbr: RADT 63B Title: RADIOBIOLOGY/RAD PROTECT

Full Title: Radiobiology Radiation Protection, and Quality Control

Last Reviewed: 9/25/2023

Units		Course Hours per Week	•	Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	17.5	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00 Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade Only

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

Catalog Description:

Principles of radiobiology, the short and long-term effects of radiation, health physics, introduction to fluoroscopy, quality control, and radiation protection procedures and design.

Prerequisites/Corequisites:

Course Completion of RADT 63A and Concurrent Enrollment in RADT 62AL

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:

Description: Principles of radiobiology, the short and long-term effects of radiation, health physics, introduction to fluoroscopy, quality control, and radiation protection procedures and design. (Grade Only)

Prerequisites/Corequisites: Course Completion of RADT 63A and Concurrent Enrollment in

RADT 62AL Recommended:

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree: Area Effective: Inactive: CSU GE: Transfer Area Effective: Inactive:

IGETC: Transfer Area Effective: Inactive:

CSU Transfer: Transferable Effective: Fall 1981 Inactive:

UC Transfer: Effective: Inactive:

CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:

Upon completion of this course students will be able to:

- 1. Define quality assurance and quality control.
- 2. Identify the early and late effects of radiation.
- 3. Differentiate between early and late effects of radiation.
- 4. Evaluate the radiosensitivity of tissues and organs.
- 5. Identify various stages of cell division, proliferation and cancer induction.
- 6. Describe the processes of mitosis and meiosis.
- 7. Explain the cardinal principles of radiation protection.
- 8. List, discuss, and explain the long and short term hazards of radiation to human beings.
- 9. Explain the cardinal principles of radiation protection.
- 10. Discuss the ALARA (As Low As Reasonably Achievable) principle.
- 11. Describe the radiation dose- response relationship.
- 12. Describe the three acute radiation syndromes.
- 13. Explain the theories and list the methods for radiation protection of medical personnel and patients.
- 14. List all of the State and National Radiation Health and Safety regulations for radiologic technology personnel.
- 15. List the fundamental principles of fluoroscopy and their impact on radiation protection.
- 16. Explain the design for radiation protection.

Topics and Scope:

- 1. Human response to radiation
 - A. Cell theory
 - B Molecular composition
 - C. Tissues and organs
- 2. Radiobiology
 - A. Law of Bergonie and Tribondeau
 - B. Radiation responses

- C. Dose response relationship
- D. Biological factors in radiosensitivity
- 3. Irradiation of macromolecules
 - A. Point lesions
 - B. Macromolecular synthesis
 - C. Radiation effects on DNA
 - D. Cell recovery
- 4. Linear energy transfer
- 5. Relative biological effectiveness
- 6. Acute radiation lethality
 - A. Prodromal period
 - B. Hematologic syndrome
 - C. Gastrointestinal syndrome
 - D. Central nervous system syndrome
 - E. Mean survival time
 - F. Local tissue damage
 - G. Hematologic effects
 - H. Cytogenetic effects
 - I. Late effects of radiation exposure
- 7. Automatic Exposure Control
 - A. Ionization chamber
 - B. Exposure adjustment
 - C. Effect of scatter radiation
- 8. Radiation Health Physics
 - A. ALARA principle
 - B. Pregnancy policy
 - C. Occupational dose
 - D. Patient exposure dose
 - E. General public exposure dose
 - F. Ethical considerations
- 9. Radiation Protection
 - A. Cardinal principles
 - B. Personnel monitoring and devices
 - C. Dose limits
 - D. Safe practices
 - 1. X-rays
 - 2. Pregnancy
 - E. Design for radiation protection
- 10. Fluoroscopy
 - A. Image intensifier
 - B. Medical television system
 - C. Image formation
 - D. Radiation protection
- 11. Quality Control
 - A. Radiographic
 - B. Fluoroscopic
 - C. Computerized tomography
- 12. Quality assurance procedure regulations/ dose limits
 - A. Federal regulatory agency
 - B. State regulatory agency

Assignment:

- 1. Weekly chapter readings (10 25 pages/week) and assignments (not graded).
- 2. Completion of 8 15 lab experiments (lab reports).
- 3. One ALARA project.
- 4. 6-10 quizzes, 1 written final, 1 lab final.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because skill demonstrations are more appropriate for this course.

Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

ALARA project

Problem solving 10 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Lab final exam

Skill Demonstrations 20 - 30%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes, mid-term, written final

Exams 60 - 70%

Other: Includes any assessment tools that do not logically fit into the above categories.

None

Other Category 0 - 0%

Representative Textbooks and Materials:

Radiologic Science for Technologists, Bushong, S., Mosby, 2011 Instructor-prepared material