

**RADT 63B Course Outline as of Fall 2007****CATALOG INFORMATION**

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

Full Title: Radiobiology and Radiation Protection

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, effects of radiation, health physics, introduction to fluoroscopy, quality assurance, and radiation protection procedures.

**Prerequisites/Corequisites:**

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

**Recommended Preparation:****Limits on Enrollment:****Schedule of Classes Information:**

Description: Principles of radiobiology, effects of radiation, health physics, introduction to fluoroscopy, quality assurance, and radiation protection procedures. (Grade Only)

Prerequisites/Corequisites: Course Completion of RADT 63A and Concurrent Enrollment in RADT 62AL ( or RADT 62A)

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;

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

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>			Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>			Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>			Effective:	Inactive:
<b>CSU Transfer:</b>	Transferable	Effective:	Fall 1981	Inactive:	
<b>UC Transfer:</b>		Effective:		Inactive:	

**CID:**

**Certificate/Major Applicable:**

Certificate Applicable Course

## **COURSE CONTENT**

### **Outcomes and Objectives:**

Upon completion of this course students will be able to:

1. Define quality assurance and quality control.
2. List the 10-step quality assurance model used in hospitals.
3. List all aspects of a quality assurance program within a typical radiology department.
4. Name the three steps of quality control.
5. Describe the processes of mitosis and meiosis.
6. Evaluate the radiosensitivity of tissues and organs.
7. Describe the radiation dose-response relationship.
8. Describe the three acute radiation syndromes.
9. Differentiate between early and late effects of radiation.
10. List, discuss, and explain the long and short-term hazards of radiation to human beings.
11. Explain the cardinal principles of radiation protection.
12. Discuss the ALARA (As Low As Reasonably Achievable) principle.
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.

### **Topics and Scope:**

- I. Quality assurance
- II. Quality control
- III. Human radiation response
  - A. Cell theory
  - B. Molecular composition
  - C. Tissues and organs
- IV. Radiobiology
  - A. Law of Bergonie and Tribondeau

- B. Radiation responses
- C. Dose response relationship
- D. Biological factors in radiosensitivity
- V. Irradiation of macromolecules
  - A. Point lesions
  - B. Macromolecular synthesis
  - C. Radiation effects on DNA
  - D. Cell recovery
- VI. Linear energy transfer
- VII. Relative biological effectiveness
- VIII. Acute radiation lethality
  - A. Prodromal period
  - B. Hematologic syndrome
  - C. Gastrointestinal syndrome
  - D. Central nervous system syndrome
  - E. Mean survival time
- IX. Local tissue damage
- X. Hematologic effects
- XI. Cytogenetic effects
- XII. Late effects of radiation exposure
- XIII. Radiation Protection
  - A. Cardinal principles
  - B. Personal monitoring and devices
  - C. Dose limits
  - D. Safe practices
    - 1. X-rays
    - 2. Pregnancy
- XIV. Quality Assurance procedures
- XV. Fluoroscopy
  - A. Image intensifier
  - B. Medical television system

### **Assignment:**

1. Weekly chapter readings (10 - 25 pages/week).
2. Completion of 8 - 10 lab experiments (lab reports).
3. One ALARA project.
4. 6 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.

Written homework, Lab reports
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Writing 10 - 20%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Lab reports, ALARA project

Problem solving  
10 - 20%

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

None

Skill Demonstrations  
0 - 0%

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

Multiple choice, True/false, Matching items, Quizzes, written final

Exams  
50 - 60%

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

Lab final exam

Other Category  
20 - 30%

**Representative Textbooks and Materials:**

- RADIOLOGIC SCIENCE FOR TECHNOLOGISTS by S. Bushong, Mosby, 2006.
- Instructor-prepared material