

Course Information

Course Title	Radiation Biology and Protection
Course Prefix, Num. and Title	RADR 2313
Division	Allied Health
Department	Radiologic Technology
Course Type	WECM Course
Course Catalog Description	Effects of radiation exposure on biological systems. Includes typical medical exposure levels, methods for measuring and monitoring radiation, and methods for protecting personnel and patients from excessive exposure. A minimum grade of "C" is required to pass this course.
Pre-Requisites	RADR 2309;2117; 2331; and 2266 with a "C" or better
Co-Requisites	None

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours: Lab/Other Hours	3:3:0
Equated Pay Hours	3
Lab/Other Hours Breakdown: Lab Hours	Enter Lab Hours Here.
Lab/Other Hours Breakdown: Clinical Hours	Enter Clinical Hours Here.
Lab/Other Hours Breakdown: Practicum Hours	Enter Practicum Hours Here.
Other Hours Breakdown	List Total Lab/Other Hours Here.

Approval Signatures

Title	Signature	Date
Prepared by:		
Department Head:		
Division Chair:		
Dean/VPI:		
Approved by CIR:		

Additional Course Information

Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

I. Introduction

- A. Molecule
- B. Basic cellular biology
- C. Types of ionizing radiation
- D. Sources of medical radiation exposure
- E. Other sources of radiation exposure

II. Radiation Energy Transfer

- A. Molecular effects of radiation
- B. Factors affecting energy transfer
- C. Cellular radiation effects
- D. Individual radiation effects
- E. Factors influencing radiation response

iii. Radiation Effects

- A. Subcellular radiation effects
- B. Cellular radiation effects
- C. Individual radiation effects

IV. Radiosensitivity and Response

- A. Law of Bergonie and Tribondeau
- B. Cell survival and recovery
- C. Systemic response to radiation
- D. Radiation dose-response curves
- E. Total body irradiation
- F. Late effects
- G. Risk Estimates

Radiation Protection

I. Introduction

- A. Justification for radiation protection
- B. Potential biological damage of ionizing radiation
- C. Objectives of a radiation protection program
- D. Sources of radiation
- E. Legal and ethical responsibilities

II. Units, Detection and Measurement

- A. Radiation units
 - 1. SI Units
 - 2. Traditional
- B. Dose reporting
- C. Radiation detectors
- D. Dose area product meter (DAP)

III. Surveys, Regulatory/Advisory Agencies and Regulations

- A. General survey procedures

- B. Equipment survey
- C. Area survey
- D. Regulatory/agencies
- E. Advisory agencies
- F. Radiation safety officer

IV. Personnel Monitoring

- A. Historical perspective
- B. Requirements for personnel monitoring
- C. Methods and types of personnel monitor
- D. Records of accumulated dose
- E. Effective dose limits
- F. Responsibilities for radiation protection I. Radiographer

V. Application

- A. Design
- B. Regulations and recommendations
- C. Cardinal principles in protection
- D. Emergency procedures

VI. Patient Protection

- A. Principles (ALARA)
- B. Radiation safety practices
- C. Education
- D. Equipment and accessories
- E. Fluoroscopic procedures
- F. Mobile radiography
- G. Special considerations
 1. Pediatric patients
 2. Pregnant patients
 3. Bariatric patients

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

1. Describe the biophysical mechanisms of radiation damage on humans.
2. Recall typical dose ranges for routine radiographic procedures.
3. Describe basic methods and instruments for radiation monitoring, detection, and measurement.
4. Apply appropriate radiation protection devices.

Methods of Assessment:

Unit Exam 1

Unit Exam 2

Unit Exam 4

Final Exam

Required text(s), optional text(s) and/or materials to be supplied by the student:

Mary Alice Statkiewicz-Sherer, Paul J. Visconti, E. Russell Ritenour, Radiation Protection in Medical Radiography, C. V. Mosby Co., St. Louis, MO.

Mary Alice Statkiewicz-Sherer, Paul J. Visconti, E. Russell Ritenour, Radiation Protection in Medical Radiography Workbook, C. V. Mosby Co., St. Louis, MO.

Suggested Course Maximum:

18

List any specific or physical requirements beyond a typical classroom required to teach the course.

Radiology Lab for experiments.

Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

End-of-unit exams (Average of written exams) 80%
Comprehensive final** 20% TOTAL 100%

**Students must pass final exam with a grade of 75 or higher to pass the course, regardless of the student's average.

92.0 - 100% = A
83.0 – 91.9% = B
75.0 – 82.9% = C
74.9% and below = F

Curriculum Checklist:

- Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.
- Administrative WCJC Core Course.** Attach the Core Curriculum Review Forms
 - Critical Thinking
 - Communication
 - Empirical & Quantitative Skills
 - Teamwork
 - Social Responsibility
 - Personal Responsibility
- WECM Course** -If needed, revise the Program SCANS Matrix and Competencies Checklist