

BRITISH COLUMBIA INSTITUTE OF TECHNOLOGY

COURSE OUTLINE

COURSE NAME Radiobiology and Radiation Protection

COURSE NUMBER MRAD3308

DATE January 1995

Prepared by E. Seeram, RTR., B.Sc., M.Sc.

Taught to Level 3

School Health Sciences

School Health Sciences

Program Medical Radiography

Program _____

Date Prepared December, 1994

Option _____

Term 3 Hrs/Wk 3 Credits 1.5

No. of Weeks 8 Total Hours 24

Instructor(s) Euclid Seeram Office SW3083 Local 8231

Office Hours As Posted

PREREQUISITES Anatomy and Physiology; Physics for Medical Radiography.

COURSE OBJECTIVES

(Upon successful completion of this course, the student will be able to:)

A. Radiobiology

1. Define Radiobiology.
2. Explain briefly the terms commonly used in clinical radiobiology.
3. Trace the history of radiation injury.
4. Discuss basic radiation interactions with tissue.
5. Explain briefly, two theories of biologic damage by radiation.
6. State what is meant by the target theory.
7. Explain two cell compartments of tissues and organs and state the meaning of the term "differentiation".
8. Define the term "radiosensitivity" and state the law of Bergonie and Tribondeau.
9. Discuss radiation effects at doses higher than the diagnostic range (High dose effects).
10. Discuss the radiation effects at doses within the diagnostic range.
11. Discuss radiation effects on the embryo, fetus and child.
12. Discuss the effects of low-level radiation over an extended period of time.

COURSE OBJECTIVES (Cont'd.)

B. Radiation Protection

1. State the objectives of radiation protection.
 2. Explain the fundamental principles of radiation protection.
 3. Discuss current radiation protection standards for diagnostic radiology
 - justification
 - optimization (ALARA)
 - dose limitation
 4. State the dose limits for radiation workers and members of the public.
 5. Discuss methods for minimizing radiation dose to both patients and personnel.
 6. Describe equipment specifications for diagnostic radiology.
 7. Describe shielding guides for diagnostic x-ray installations.
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EVALUATION

Final Examination	<u>50</u>	%	2 hours
Mid-Term	<u>50</u>	%	1 hour
Projects	<u> </u>	%	
Laboratory	<u> </u>	%	You must achieve 60% to pass this course.

REQUIRED TEXT(S) AND EQUIPMENT

1. Primer of Medical Radiobiology by Elizabeth Travis, 2nd Edition, Year Book Medical Publishers, 1989.
 2. Safety Code – 20A: X-Ray Equipment in Medical Diagnosis, Part A, Health and Welfare Canada, 1990.
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REFERENCE TEXTS AND RECOMMENDED EQUIPMENT

1. Current CAMRT Curriculum Guide.
 2. Medical Radiation Biology by Pizzarello and Witcofski, 2nd Edition, Lea and Febiger, 1982.
 3. Christensen's Physics of Diagnostic Radiology, 4th Edition, Lea and Febiger, 1990.
 4. Radiologic Science for Technologists by Bushong, 5th Edition, C.V. Mosby, 1993.
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COURSE OUTLINE
(continued)

Week Lecture or Lab Number	Material Covered	References
1	Radiobiological Concepts Radiation Interaction with Tissue	
2	Radiosensitivity Bioeffects at Doses Higher than the Diagnostic Range	
3	Bioeffects at Doses at the Diagnostic Range Effects of Radiation on Embryo, Fetus and Child	
4	Low Level Radiation Effects Principles of Radiation Protection	
BD-Feb 27 MID TERM EXAMINATION AC-March 6		
5	Dose Limits Protection of Patients and Personnel	
6	Equipment Specifications	
7	Shielding for X-ray Installations	
8	FINAL EXAMINATION	