

El Paso Community College

Syllabus

Part II

Official Course Description

SUBJECT AREA	<u>Radiation Therapy Technology</u>
COURSE RUBRIC AND NUMBER	<u>NMTT 1303</u>
COURSE TITLE	<u>Radiation Biology and Safety</u>
COURSE CREDIT HOURS	<u>3 3 : 0</u> Credits Lec Lab

I. Catalog Description

Presents the principles of radiation biology and safety. Includes the effects of radiation on biologic systems, genetic and subcellular interactions and occupational exposure of radiologic personnel. A grade of a “C” or better is required to take the next course. **Corequisite: RADT 1267. (3:0).**

II. Course Objectives

A. Unit I. Human Biology

1. Discuss the cell theory of human biology.
2. Describe the molecular composition of the human body.
3. Describe the parts and functions of the human cell.
4. Describe cell growth.
5. Describe the effects of radiation at the cellular level.
6. Evaluate human response to ionizing radiation.

B. Unit II. Fundamental Principles of Radiobiology

1. State the law of Bergonie and Tribondeau.
2. Identify the physical factors affecting response to radiation.
3. Identify the biological factors affecting response to radiation.
4. Explain the radiation dose-response relationship.

C. Unit III. Molecular and Cellular Radiobiology

1. Describe the effects of in vitro radiation.
2. List five radiation responses of DNA.
3. Describe the events that lead to radiolysis of water.
4. Compare the direct/indirect effects of radiation.
5. Explain the principles of target theory.
6. Discuss the kinetics of human cell survival.

D. Unit IV. Early Effects of Radiation

1. Define early effects of radiation.
2. Describe radiation syndromes.
3. Define LD 50/60.
4. List skin effects of radiation.
5. Describe hematologic effects of radiation.
6. Describe cytogenic effects of radiation.
7. Describe the effects of radiation on ovaries and gonads.

E. Unit V. Late Effects of Radiation

1. Explain the difficulties of epidemiologic studies and stochastic effects.
2. Describe the local tissue effects of radiation
3. Discuss the risks of radiation to health professionals.

4. Discuss radiation-induced malignancies.
5. Discuss radiation risks during pregnancy
6. Discuss the genetic effects of radiation.

F. Unit VI. Health Physics

1. Define health physics.
2. Discuss the principles of radiation protection.
3. State the purposes of the NCRP.
4. List dose units for whole body radiation for workers and the public.
5. Discuss special considerations for pregnant workers/patients.

G. Unit VII. Designing for Radiation Protection

1. List the radiation protection features of machinery.
2. List radiation protection features of fluoroscopy units.
3. Describe protective barriers.
4. Describe types of radiation detection devices and their uses.

H. Unit VIII. Radiation Protection Procedures:

1. Identify occupational radiation exposure units of measurement.
2. Describe types of x-ray exams and precautions for each.
3. Identify three ways patient dose can be reported.
4. Identify types of radiation monitors and how they are used.
5. Explain what is given on a radiation report.
6. Explain how radiation shields are used.

III. THECB Learning Outcomes (WECM)

1. Calculate radiation dose limits for various groups within the population.
2. Apply radiation safety principles involved in record keeping.
3. Discuss the somatic and genetic effects of radiation.
4. Identify ways to reduce patient and occupational exposure to radiation.
5. Describe both early and delayed effects of radiation.

IV. Evaluation

A. Methods

1. Homework and quizzes
2. Unit examinations
3. Comprehensive final examination

B. Grading Scale

- A = 93-100
 B = 85-92
 C = 75-84
 F = Below 75

V. Disability Statement (American with/Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.