Minneapolis West Community & Technical College

Course Outline

Faculty are required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Collegewide Curriculum Committee.

DEPT: Radiology COURSE NO: RDT2240

COURSE TITLE: Principles of Radiobiology

CATALOG DESCRIPTION: This course is designed to establish a basic knowledge of atomic structure and terminology, and provide an overview of the principles of radiation protection and interaction with living systems. Also presented are the nature and characteristics of radiation, (i.e. its effects on molecules, cells, tissues, and the body as a whole) x-ray production and the fundamentals of photon interactions with matter. Radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies, healthcare organizations, and the responsibilities of the radiographer for patients, personnel and the public are also incorporated. Factors affecting biological response are presented including acute and chronic effects of radiation.

AUDIENCE: Radiologic Technology Students

FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)
Area : by meeting the following competencies:
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PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE: Radiological Exposures II & BIOL2202

LENGTH OF COURSE: Four hours per week for 16 weeks.

THIS COURSE IS USUALLY OFFERED:
Every other year ☐ fall spring ☒ summer ☐ undetermined ☐

Four goals are emphasized in course at Minnesota West Community & Technical College:

1) ACADEMIC CONTENT: The student will identify the characteristics of radiation and the importance of radiation protection.
2) THINKING SKILLS: The student will be able to adapt radiation protection skills to the specific needs of all patients in the radiology department.
3) COMMUNICATIONS SKILLS: The student will explore their values and experience and the impact on all radiology patients and health care.
4) HUMAN DIVERSITY: The student will explore cultural influences as it relates to all radiology patients.

TOPICS TO BE COVERED:
See course goals and outcomes.

LIST OF EXPECTED COURSE OUTCOMES:
1. Identify and justify the need to minimize radiation exposure of humans.
2. Differentiate between somatic and genetic radiation effects as well as discuss specific diseases or syndromes associated with them.
3. Differentiate between stochastic and non-stochastic effects of radiation exposure.
4. Explain the objectives of a radiation protection program.
5. Define radiation and radioactivity units of measurement.
6. Identify dose limits for occupational and non-occupational radiation exposure.
7. Discuss legal and ethical radiation protection responsibilities of radiation workers.
8. Describe the theory, operation, applications and limitations of radiation detection devices.
9. Distinguish between controlled and non-controlled areas and list acceptable exposure levels.
10. Describe the function of federal, state and local regulations governing radiation protection practices.
11. Describe personnel monitoring devices, including applications, advantages and limitations for each device.
12. Identify anatomical structures that are considered critical for potential late effects of whole body irradiation exposure.
14. Demonstrate how the operation of various x-ray and ancillary equipment influences radiation safety and describe the potential consequences of equipment failure.
15. Demonstrate how time, distance and shielding can be manipulated to keep radiation exposures to a minimum.
16. Explain the relationship of exposure factors to patient dosage.
17. Describe the minimum source to table top distances for fixed and mobile radiographic fluoroscopic devices.
18. Apply safety factors for the patient (and others) in the room during mobile radiographic procedures.
19. Describe the characteristics of a molecule.
22. Describe radiation-induced chemical reactions and potential biologic damage.
23. Describe physical, chemical and biologic factors influencing radiation response of cells and tissues.
24. Explain factors influencing radiosensitivity.
25. Recognize the clinical Significance of LD 50/30 and LD 50/60.
26. Examine effects of limited vs. total body exposure.
27. Relate short-term and long term effects as a consequence of high and low radiation doses
28. Discuss risk estimates for radiation induced malignancies

LEARNING/TEACHING TECHNIQUES used in the course are:
X Collaborative Learning   X Problem Solving
X Student Presentations   Interactive Lectures
   Creative Projects   Individual Coaching
X Lecture   X Films/Videos/Slides
X Demonstrations
 Lab

ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:
X Reading   X Tests   Individual Projects
[Oral Presentations]   X Worksheets   X Collaborative Projects
X Textbook Problems   Papers   [Portfolio]
[Group Problems]   [Term Paper]
[Other (describe below)]

EXPECTED STUDENT LEARNING OUTCOMES: See Above.

"This course will cover the characteristics of hazardous wastes and its safe handling, storage, and disposal."

The information in this course outline is subject to revision

Veteran Services: Minnesota West is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that conflict with scheduled course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Minnesota West Veterans Service Office.

To receive reasonable accommodations for a documented disability, please contact the campus Student Services Advisor or campus Disability Coordinator as arrangements must be made in advance. In addition, students are encouraged to notify their instructor.

This document is available in alternative formats to individuals with disabilities by contacting the Student Services Advisor or by calling 800-658-2330 or Minnesota Relay Service at 800-627-3529 or by using your preferred relay service.

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