RAD101 Radiation Protection

I. CATALOGUE DESCRIPTION

A. Pre-requisites: Acceptance to the Radiologic Technology Program, Reading Proficiency

B. Credit hour award: 2

C. Description: Overview of the principles of radiation protection, including the responsibilities of the radiographer for patients, personnel and the public. Radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies and health care organizations are incorporated. (F)

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

<table>
<thead>
<tr>
<th>Expected Learning Outcomes</th>
<th>Assessment Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify and justify the need to minimize unnecessary radiation exposure to humans.</td>
<td>Written Assignments</td>
</tr>
<tr>
<td></td>
<td>Written Examinations</td>
</tr>
<tr>
<td>Create a safe environment during radiation exposure for patient, personnel, and self.</td>
<td>Class Discussion/Activity</td>
</tr>
<tr>
<td></td>
<td>Written Examination</td>
</tr>
<tr>
<td></td>
<td>Written Assignments</td>
</tr>
<tr>
<td>Explain the objectives of a radiation protection program.</td>
<td>Class Discussion/Activity</td>
</tr>
<tr>
<td></td>
<td>Written Examination</td>
</tr>
<tr>
<td></td>
<td>Written Assignments</td>
</tr>
<tr>
<td>Describe the function of federal/state, and local regulations governing radiation protection practices.</td>
<td>Written Examination</td>
</tr>
<tr>
<td></td>
<td>Written Assignments</td>
</tr>
<tr>
<td>Identify effective dose limits for the radiation worker, general public, embryo and fetus.</td>
<td>Written Examination</td>
</tr>
<tr>
<td></td>
<td>Written Assignments</td>
</tr>
<tr>
<td>Perform calculation of exposure with varying time, distance and shielding.</td>
<td>Written Examination</td>
</tr>
<tr>
<td></td>
<td>Written Assignments</td>
</tr>
<tr>
<td>Explain the purpose and importance of patient shielding.</td>
<td>Written Examination</td>
</tr>
<tr>
<td></td>
<td>Written Assignments</td>
</tr>
</tbody>
</table>

III. OUTLINE OF TOPICS

A. Introduction
   1. Justification for radiation protection
a. Somatic effects
b. Genetic effects

2. Potential biological damage of ionizing radiation
   a. Stochastic effects
   b. Nonstochastic effects

3. Objectives of a radiation protection program
   a. Documentation
   b. Occupational and nonoccupational dose limit
   c. ALARA (As Low As Reasonably Achievable)

4. Sources of Radiation
   a. Natural
   b. Man-made

5. Legal and ethical responsibilities

B. Units, Detection and Measurement
   1. Radiation units
      a. Exposure
      b. Absorbed dose
      c. Kerma
      d. Dose equivalent
      e. Radioactivity
   2. Dose reporting
      a. NRC Regulations (Nuclear Regulatory Commission)
      b. NRCP guidelines (National Council on Radiation Protection and Measurement)
   3. Radiation detectors
      a. Area monitors
      b. Personal detectors

C. Surveys, Regulatory/advisory Agencies and regulations
   1. General survey procedures
      a. Qualified expert
      b. Records
   2. Equipment survey
   3. Area survey
   4. Regulatory agencies
   5. Advisory agencies

D. Personal Monitoring
   1. Historical perspective
   2. Requirements for personnel monitoring
   3. Methods and types of personnel monitoring
   4. Records of accumulated dose
   5. Effective dose limits
      a. Occupational
      b. Nonoccupational
c. Critical organs
d. Embryo and fetus

6. Responsibilities for radiation protection
   a. Radiographer
   b. Radiation safety officer
   c. Facility

E. Application
   1. Types of barriers
      a. Primary
      b. Secondary
   2. Value Layers
   3. Primary principles in protection

F. Patient Protection
   1. Beam limiting devices
   2. Filtration
   3. Shielding
   4. Exposure factors
   5. Positioning
   6. Immobilization
   7. Fluoroscopic procedures
   8. Mobile radiography

IV. METHOD(S) OF INSTRUCTION

This course is taught using a variety of instructional methods, which include but are not limited to interactive lectures, computer presentations, group activities and exercises, videos, supplemental handouts and student presentations. Students are expected to be ACTIVE participants in the learning process. Students are expected to read the assigned readings prior to scheduled class meetings and come to class prepared to actively participate in all activities.

V. REQUIRED TEXTBOOK(S)

VI. REQUIRED MATERIALS
   A. A computer with internet access and basic software to include Word and Power Point (available through Jefferson College labs)
B. Course homepage available through Blackboard  
C. Binder, paper, pens, pencils with erasers, highlighters

VII. SUPPLEMENTAL REFERENCES
B. Class Handouts
C. Library Resources  
   1. Textbooks  
   2. Periodicals  
   3. Films On Demand Videos
D. Internet Resources  
   1. On-line references  
   2. Textbook companion website

VIII. METHOD OF EVALUATION (basis for determining course grade)

GRADES—Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material. A final semester grade of 80% or above must be achieved in this course to successfully complete this course.

Grades will be based on weekly written assignments, examinations, class discussions/activities, and discussion boards.

Assignments will vary based on content coverage and are at the discretion of the instructor.

EXAMS – Exams will be given on the dates published in the class schedule. All exams with scores less than 75% must be retaken until a score of 75% or above is achieved to complete course requirements. The original score will be used to figure the semester grade. The student will be allowed to retake an exam a maximum of two times. If the student has not passed an exam within the three designated attempts, the student will present to the review board and may be dismissed from the program. The student must contact the instructor prior to any absence to make arrangements for retesting. Until course requirements are met, the final grade will be an incomplete.

If an exam is not taken at the scheduled time and arrangements for a make-up exam have not been made prior to the designated exam time, the grade for that exam will be zero. No make-up exam will be considered unless the instructor is personally notified prior to the absence. If a student arranges to take the exam at other than the scheduled time, 5% will be deducted from the grade on that exam. Make-up exams are scheduled at the convenience of the instructor.
Student’s grade will also be based on participation in class and attendance.

QUIZZES. If a quiz is not taken at the scheduled time the grade for that quiz will be zero. No make-up quizzes will be considered.

ASSIGNMENTS - Please plan to devote at least four to six hours per week in addition to class meetings for completing homework assignments, reviewing, composing rough and final drafts, and preparing for the next class session. In order to be prepared for each class meeting, the student should complete each homework assignment prior to the following class meeting.

GRADING SCALE-(Jefferson College Radiologic Technology Program’s)
A= 100-92%
B= 91.9-86%
C= 85.9-80%
D= 79.9-70%
F= 69.9 and below
I= Incomplete
W= Excused withdrawal from course

IX. ADA AA STATEMENT
Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT
All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, http://www.jeffco.edu).

XI. ATTENDANCE STATEMENT
Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.
Student’s grade will also be based on participation in class and attendance.

XII. OUTSIDE OF CLASS ACADEMICALLY-RELATED ACTIVITIES
The US Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically-related activities such as reading, studying, and completing assignments. Specifically, time spent on academically-related activities outside of
class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.