

**St. Catharine College  
Radiography Program  
Radiologic Physics  
Fall 2009**

**Course Syllabus:** RAD 225  
**Credits:** 3 Credit Hours  
**Prerequisite:** Admission into Radiography Program  
**Hours:** 9:00 AM – 10:15 AM, MTWTh, First Quarter

**Instructors:** Michael Connor, Ph.D.  
Phone: 859-336-5082, Extension 1331  
E-Mail: mconnor@sckky.edu

**Text:** Stewart C. Bushong, *Radiologic Science for Technologists: Physics, Biology, and Protection*, 8<sup>th</sup> ed., The C. V. Mosby Company, St. Louis, 2001.

**References:** Handouts and other materials as needed in class.

**Description:** This course will acquaint the student with physics as applied to radiographic imaging, including atomic structure, electromagnetic radiation, and the production of radiation.

**Objectives:** Upon completion of the course the student should be conversant in the following:

1. Atomic structure
2. The nature of electromagnetic radiation
3. X-ray interactions with matter
4. Production of x-rays
5. The x-ray tube
6. X-ray instrumentation
7. Fluoroscopic and mammographic imaging equipment
8. Digital/computed radiography

**Outline:**

*I. Structure of Matter*

- a. Atomic structure
- b. Binding energy
- c. Ionization and Excitation
- d. Mass-energy equivalent

*II. Electromagnetic Radiation*

- a. Visible light
- b. Energy, frequency, wavelength relations
- c. Planck's constant
- d. X-rays and gamma rays

*III. Interaction of radiation with matter*

- a. Charged particle interactions
  1. Mechanisms

2. Mass-related properties

3. Range
- b. Photon interactions
  1. Mechanisms
  2. Attenuation

*IV. Production of X Rays*

- a. The x-ray tube
- b. The x-ray machine circuit
- c. Cooling

*V. Special Imaging Equipment*

- a. Fluoroscopy
- b. Mammography
- c. Digital/Computed Radiography

## **Grading and Requirements:**

### **I. Lecture**

- A. Regular attendance is expected. It will be the responsibility of the STUDENT to ask for the materials and assignments missed when absent from class. Assignments will be due on the first day of your return to class.
- B. See Radiography Handbook for Attendance Policy.
- C. It is each student's responsibility to keep up with assigned readings and assignments covered in class. Quizzes will be given with and without prior notice.
- D. Tests and quizzes may be made up according to guidelines listed in the Radiography Student Handbook.
- E. The instructor reserves the right to change the schedule.

### **II. Academic Honesty**

Students should refer to S.C.C. Code of Student Conduct in the S.C.C. Handbook.

### **III. Code of Student Conduct:**

All rules set forth in the Radiography Handbook will be adhered to in this course.

### **IV. Written Examinations:**

Two examinations and a comprehensive final examination will be given through the semester. Examinations are not cumulative. These examinations are designed to measure the student's understanding of course material and ability to articulate the answers to various types of questions in the written form. Questions will be multiple choice and will require the student to use reasoning ability and critical thinking to analyze various topics discussed during lecture. The final examination will be cumulative and in a multiple choice format. In addition, occasional unannounced quizzes will be given.

### **GRADING SCALE AND EVALUATION BREAKDOWN**

|              |                  |
|--------------|------------------|
| A = 93 – 100 | Unit Test = 75%  |
| B = 86 – 92  | Final Exam = 20% |
| C = 78 – 85  | Quizzes = 5%     |
| D = 70 – 77  |                  |
| F = 0 – 69   |                  |

***SYLLABUS IS SUBJECT TO CHANGE WITH PRIOR NOTICE***