

1 Course Syllabus + Study Guide for Lecture and Laboratory

BERGEN COMMUNITY COLLEGE
Division of Health Professions/Radiography
Program

A. General Course Information

Title:	Radiography I
Credits:	4 (3 hrs. lecture, 6 hrs. lab)
Code:	RAD 181
Prerequisites:	Official acceptance into the radiography program
Corequisites:	RAD 180 (Introduction to Radiography) RAD 182 (Radiography Clinical I)

B. Course Instructor Radiologist Technology Faculty

C. Course Description

RAD 181 - Radiography I, introduces the study of radiography and the ethical considerations of this medical field. The theory and application of positioning, radiation protection techniques, and basic radiographic exposure, along with associated film critiques and laboratory experiments are covered in this course.

D. Statement of Purpose:

The purpose of this course is to:

- Become familiar with all aspects of modern radiography and how it relates to patient care
- Introduce basic positioning principles and practices
- Introduce the processes of analysis, critical thinking and problem solving
- Become proficient in all phases of radiography clinical under the supervision of clinical faculty.
- Prepare the student for clinical experience on patients in the hospital environment.
- Comply with a competency-based education system with regard to lectures, observation, testing, and demonstration and competency evaluations.

E. Learning Outcomes:

Upon completion of this course, the radiography student will be:

- Able to explain the role of the radiographer and the part radiology plays in medicine.
- Able to provide information on various standards, the positions of the structures and organs of the body, supplemented with practical instruction and application in the lab. Procedures learned and tested on campus can be started within each of the hospitals at a progressive pace.
- Familiar with the factors influencing radiographs and their effect on the quality of a radiograph including patient and operator protection.
- Familiar with the proper handling of patients and meeting their psychological needs.
- Provided with the information on radiation dosages, monitoring devices, and protection devices used to reduce radiation exposure.
- Familiar with the basic medical terminology commonly used in radiography.
- Functioning well under various hospital situations and applying the principles of radiography as taught at the college.
- Defining and describing the clinical data necessary, including the patient's name, x-ray number, examination date, institution's name, and proper anatomical markers.
- Analyzing and describing the radiographic image.
- Recognizing and describing the proper film size required for the examination, and that proper collimation was used

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- Defining and describing the routine projections for the part, and that the part has been properly positioned, that positioning landmarks have been identified and utilized, radiographic evidence of proper positioning is demonstrated, and, if applicable, that positioning or immobilizing devices were used.
- Identifying and describing the gross anatomy of the part or region being examined, the anatomy presented on the radiographic image, and any anatomical anomalies present on the radiograph.
- Identifying and analyzing the general quality of a radiograph, identifying any artifacts present on the radiograph, and the corrections that are necessary.
- Presenting acceptable radiographs to the radiologist for interpretation.

F. Course Materials

1. A small notebook for positioning notes in the lab.
2. Required texts, radiography notebook and power-point materials.
3. Initial markers must be ordered for hospital and lab use (2 sets required).
4. A dosimeter will be provided for both lab and clinical experience. The students are required to hand them in to the clinical education coordinator when requested. (there is a \$12 late or lost fee).
5. Students are expected to bring their textbook and workbooks to each lecture and lab session.

G. Required Course Textbook

- 1) Title: Textbook of Radiographic Positioning and Related Anatomy
(Plus Bontrager Workbook)
Author: Bontrager, Mosby Systems
Edition: 10th edition

H. Teaching Methodologies

- Formal lectures and Discussion
- Laboratory group and individual radiographic positioning
- Power-point lecture materials
- Image review in the lab and Oral presentations of radiographs in the lab
- Labeling of all anatomical structures and Completion of all related modules
- Review of all procedures in the competency manual
- Other hand-out materials and instructor generated assignments.

I. Determination of Final Course Grades and Related Policies

Test 1 -----	10%
Test 2 -----	15%
Midterm -----	30%
Final exam -----	30%
RAD 181 quizzes -----	10%
Practicum -----	5%

- Students may review assessments if the instructor has not reviewed in class, by appointment during office hours with the instructor. If done on paper Examinations cannot leave the testing area/office.
- Students may review all assessments, by making an appointment with the instructor during office hours.
- Under no circumstances may tests/quizzes/exams be copied or photographed.
- Students may have only one opportunity to make up a missed assessment/test/exam. The make-up assessment Will be of a different format than the original.

**** Pease note:** Students MUST pass the midterm and final examination with a combined average of at least 77% to insure retention of knowledge. If a student achieves the 77%, on the combined exams, then all other course grades will be averaged to complete a final grade.

If a student does not achieve a combined examination average of 77% then the course must be repeated, prior to any further progression

The rationale for this strict grading policy:

RAD 181 is the foundation course for the entire program and career knowledge of a well-educated Radiologic Technologist. All future classes will continue to build upon this foundation as the student progresses. As a practicing Technologist the material presented in this course will be utilized on a daily basis.

This course information must be retained over the course of two years and beyond, not only to be successful with the subject area on the registry examination, but the career of a radiologic technologist.

Program Grading System:

<u>GRADES:</u>	<u>POINT VALUE:</u>
A	92-100
B+	89-91.9%
B	83-88.9%
C+	80-82.9
C	77-79.9
D	70 - 76.9 Not recognized by the program- course must be repeated
F	69.9 and below Unsuccessful

J. Subject Matter

- Medical terminology (questions will be included on all assessments).
- Patient care practices. Patient transportation Positioning of the chest, abdomen, upper extremities
- Overview of radiographic anatomy & physiology
- Radiographic quality and Basic principles of radiographic exposure and radiation protection
- Basic imaging equipment and x-ray production and Technical factors manipulation
- Introduction to digital and computed radiography

K. Weekly Lecture Content

Week 1: 1- Orientation to course and program Explanation of the syllabus and course requirements.

Week 2 1- Radiation safety practices and principles continued
2- terminology associated with radiographic imaging body positions, projections and planes.

Week 3 1- Introduction to the x-ray tube, Basic x-ray production, Parts and functions
2- Anatomy of the chest and mediastinum and Chest radiography basic positions
3- Quiz 1

Week 4 TEST #1

Week 5 1- Positions, projections, planes and terms related to patient positioning
2- Chest radiography alternate projections/methods

- Week 6 1-Anatomy and positioning of the abdominal patient (3-way).
2-Basic technique principles. Introduction to functions.
- Week 7 Midterm Exam
- Week 8 1-Anatomy of the fingers, hand and wrist.
2-Radiography of the fingers, hand and wrist; routine and alternative projections.
- Week 9 1-Anatomy of the forearm and elbow
2-Routine, alternative and trauma projections for the forearm and elbow.
- Week 10 Test #2
- Week 11 1-Anatomy of the humerus and shoulder girdle.
2-Routine, alternative and trauma projections, for the humerus and shoulder.
3-Anatomy and positioning of the clavicle and scapula.
- Week 12 1-Anatomy of the rib cage and sternum
2-Routine and trauma projections and positions for the ribs and breast bone.
3-Technique manipulation; functions varied to mA, exposure time, kVp, screens and distance.
- Week 13 1-Introduction to digital radiography, computed radiography and picture archive communications systems. Components of each imaging system and Basic functions
- Week 14 Final examination. Comprehensive Laboratory Practicum.
- Week 15 Course wrap up and continued laboratory practicum if necessary

- Laboratory Experience Outline** in order to maximize the laboratory experience, students must review and study the lecture content before each laboratory session. Please bring the textbook, notebook and supplemental materials to each laboratory session. LABORATORY EXPERIENCES WILL FOLLOW THE BASIC LECTURE OUTLINE.
The order is subject to change depending upon student progress.
- Unit Objectives** Unit 1: TOPICS: Orientation to radiography, ethics, basic position and medical terminology, lab equipment, anatomy and positioning of the finger, hand and wrist, basic radiographic technique, basic protection and Radiologic terminology.

UPON COMPLETION OF THIS UNIT, THE STUDENTS WILL BE ABLE TO:

- Discuss terminology prefix and suffixes and positioning planes
- Accurately position the finger, hand, and wrist along with the anatomy of the finger, hand & wrist.
- Set standard exposure factors on the control panel
- Demonstrate central ray locations for the finger, hand and wrist.
- Outline the steps required to perform a routine diagnostic procedure.
- Organize a system for positioning when following the criteria for general positioning.
- Understand the function of the film receptor. Operate technical modifications for soft tissue.

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- Conduct methods of protection for the patient and operator.
- Properly prepare the patient for upper extremity radiography.
- Effectively answer questions regarding an x-ray procedure of the finger, hand, and wrist.
- Understand professionalism, ethics, and legal aspects. Practice basic concepts of body mechanics.

Unit 2: TOPICS: X-ray production, anatomy and positioning of the forearm and elbow (proximal humerus), basic technique conversions, anatomy and positioning of the humerus, shoulder, clavicle and scapula, anatomy and positioning of the chest, basic radiation protections, x-ray film and cassettes, Inverse Square law. and mAs distance formula.

UPON COMPLETION OF THIS UNIT, THE STUDENTS WILL BE ABLE TO:

- Position accurately and explain the anatomy of the forearm, elbow, humerus, shoulder, clavicle scapula, rib cage and sternum. Position explain the anatomy of the chest on radiographs.
- Apply basic principles for converting exposure factors. Explain MPD levels of exposure.
- Know steps for protection of the patient and operator. Know basic radiation biology concepts.
- Effectively critique radiographs of the upper extremity and chest.
- Explain methods to control scattered radiation. Understand how distance relates to film density.
- Explain respiratory anatomy. Detect motion on a radiograph. Identify major thoracic structures.

Unit 3: Topics: X-ray tube and generating components, anatomy and positioning of the abdomen, basic radiographic technique and radiation protection for abdominal studies, basic grid function, filters, collimators, anatomy in the four quadrants and nine sections of the body, positioning landmarks for abdominal films.

UPON COMPLETION OF THIS UNIT THE STUDENTS WILL BE ABLE TO:

- Position accurately and explain the anatomy contained within the abdomen.
- Apply proper technical factors for adequate density and reasonable contrast and without motion
- Discuss basic radiation protection principles in abdomen radiography.
- Effectively critique radiographs of the abdomen and label important structures.
- Explain x-ray production and the steps involved in generating x-rays.
- List the basic components of the x-ray tube.
- Recognize anatomical structures found within the sections and quadrants of the abdomen.
- Demonstrate methods of controlling secondary radiation.
- Compare the grid cassette and its function to the bucky. Explain rotating/stationary anode tubes /cathode.
- Discuss leakage, primary, remnant secondary and scatter radiations. Calculation of heat units, the anode cooling and tube rating charts. Differentiate between inherent, added and total filtration concepts.
- Manipulate technical factors to adjust density and contrast of the radiograph.
- Formulate phototiming and conventional technical factors for abdominal studies.

Specific course policies:

- 1) Absences of more than one time in class and/or one time in the lab is considered excessive. RATIONALE: This course is a foundation course for the entire Radiography Program.
- 2) Students may have only one opportunity to make up a missed assessment/test/exam. The make-up assessment Will be of a different format then the original. Any further missed assessments will result in a zero grade.

**** Pease note:** Students MUST pass the midterm and final examination with a combined average of at least 77% to insure retention of knowledge.

The rationale for this strict grading policy:

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If a student achieves the 77%, on the combined exams, then all other course grades will be averaged to complete a final grade.

If a student does not achieve a combined examination average of 77% then the course must be repeated, prior to any further progression in the Radiography program.

- 3) Policies/lessons/testing dates contained within this syllabus are subject to change at any point of the semester. Students will be informed of any change electronically, through the BCC email system.

RAD 181 ACKNOWLEDGEMENT

_____ I realize that the policies contained within this syllabus are subject to change at any time due to student needs and time allotted. Students will be notified electronically of any changes.

I, _____ do hereby attest to
(Please print name)

the fact that I have read this syllabus and understand what objectives are necessary for successful completion of this course.

_____ I am aware that in order to pass this course the mid-term and final examination must be at least 77% when averaged. If the 77% is achieved, then the remaining course grades will be factored in.

_____ I further realize that the minimum passing final grade for this course is a 77% which is in alignment with the American Registry of Radiologic Technologists' certification examination, (after smoothing).

_____ I also realize that the policies contained within this syllabus are subject to change at any time due to student needs and time allotted. I will be notified electronically of any changes.

My signature below indicates that I have read, understand and will abide by all policies contained within this Syllabus.

Student signature: _____

Date: _____