



A POLYTECHNIC INSTITUTION

School of Computing and Academic Studies
Program: Medical Radiography
Option:

Phys 3385
Physics: Medical Radiography 3

Start Date:	January 5	End Date:	April 29
Total Hours:		Total Weeks:	15
Hours/Week:	2	Term/Level:	1
Lecture:	1	Course Credits:	2
Lab:	1	Shop:	
Seminar:		Other:	

Prerequisites:

Phys 3385 is a prerequisite for:

Course No.	Course Name
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Course No.	Course Name
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Phys 2285	Physics: Medical Radiography 2
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■ Course Description (required)

Physics of Medical Radiography 3 emphasizes the application of physical phenomena in medical radiography. Topics include anode heat loading, quantum noise, computed radiography and digital radiography. The physics of such devices as CCD cameras, photostimulable phosphor plates and other x-ray detectors will be discussed.

Evaluation

Quizzes	10%	Comments: A mark of 60% is required to pass this course
Term Test	35%	
Laboratory Reports	15%	
Final Exam	40%	
TOTAL	100 %	

■ Course Learning Outcomes/Competencies

Upon successful completion, the student will be able to:

- describe considerations in anode design relating to heat loading
- use radiographic ratings charts to solve problems relating to anode heat loading
- describe source of image blurring in radiography
- describe and perform calculations relating to image noise
- describe digital imaging concepts using appropriate terminology
- describe and perform calculations relating to binary numbers
- calculate memory requirements for digital images
- describe the basic design and operation of digital detectors, including photostimulable phosphor plates, flat panel detectors and CCD cameras.

Competency profile

This course provides a foundation of applied science for the Radiography program, and in the process, covers a portion of the following competencies:

- A2.6, A4.2, A4.10, A5.4, A5.6, A5.7, A5.8, A7.5, A7.7
- B1.5, B1.6, B1.7, B1.8, B2.1, B2.2, B2.3, B2.5, B3.2, B3.3, B4.1, B4.2, B5.1, B5.2, B5.3
- C2.4, C2.7
- D1.13, D1.14, D2.2, D3.1, D3.2

■ Verification

I verify that the content of this course outline is current.

J. Talman
Authoring Instructor

January 4, 2006
Date

I verify that this course outline has been reviewed.

A. J. Spinto
Program Head/Chief Instructor

January 4, 2006
Date

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

▼ **Instructor(s):** X

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■ **Learning Resources**

Required:

- Bushong, Stewart C., *Radiologic Science for Technologists: Physics, Biology and Protection*, 7th edition, Mosby, (2001).
- A Manual of Experiments in Medical Radiography Technology

Recommended:

- Scientific calculator (bring to every lecture)

■ **Information for Students**

Passing Grade: The passing grade in this course is 60%. The final mark is a weighted average of all tests and lab work.

Laboratory Reports: will be completed each week and graded by an instructor. **Students must complete the laboratory exercises and hand in finished reports on time to obtain a grade.** No marks will be given for experiments from which you were absent, except by special arrangement with instructor.

Assignments: late assignments, lab reports or projects will NOT be accepted for marking. Assignments must be done on an individual basis unless otherwise specified by the instructor.

Makeup Tests, Exams or Quizzes: There will be NO make up tests, exams or quizzes. If you miss a test, exam or quiz, you will receive zero marks. Exceptions may be made for DOCUMENTED medical reasons or extenuating circumstances. In such a case, it is the responsibility of the student to inform the instructor IMMEDIATELY.

Ethics: BCIT that all students attending the Institute will follow a high standard of ethics. Incidents of cheating or plagiarism may, therefore, result in a grade of zero for the assignment, quiz, test, exam, or project for all parties involved and/or expulsion from the course.

Attendance: The attendance policy as outlined in the current BCIT Calendar will be enforced. Attendance will be taken at the beginning of each session. Students not present at that time will be recorded as absent.

Illness: A doctor's note is required for any illness causing you to miss assignments, quizzes, tests, projects, or exam. At the discretion of the instructor, you may complete the work missed or have the work prorated.

Attempts: Students must successfully complete a course within a maximum of three attempts at the course. Students with two attempts in a single course will be allowed to repeat the course only upon special written permission from the Associate Dean. Students who have not successfully completed a course within three attempts will not be eligible to graduate from the appropriate program.

Course Outline Changes: The material or schedule specified in this course outline may be changed by the instructor. If changes are required, they will be announced in class.

Schedule

Week(s) of	Outcome/Material Covered	Reference/ Reading
Jan 9,16,23	Anode Heat Loading • Conduction, Convection and Radiation • Maximum heat load • Heat loss; fixed anode and rotating anode • Maximum power input curve • Anode heating and cooling curves	Bushong, Ch 10
Jan 30, Feb 6	Image Noise and Blurring • blurring • quantum noise • electronic noise	
Feb 13, 20, 27 Midterm: March 7	Digital Concepts • Terminology • Bits and bytes • Binary numbers and number of grey levels • Memory organization and size • Data acquisition • Analog to digital conversion • PACS, DICOM, and JPEG	Bushong, Ch 28
Mar 20, 27	Computed Radiography • Photostimulable phosphor plate • Latent image • Characteristic Curve • Resolution • Advantages and disadvantages	Bushong, Ch 28
April 3, 10 Review: April 17	Digital Radiography • Direct and Indirect • Direct to digital • Scanned Projection Radiography • Amorphous silicon flat panel detector • CCD camera	Bushong, Ch 28