RADIOGRAPHY

**CODE:** RAD-130

**TITLE:** Radiographic Exposure I

**DIVISION:** Science Math and Technology

**COURSE DESCRIPTION:** This course focuses on the factors that influence the production of the radiographic image. It emphasizes the processing requirements, components, and procedures. It identifies the construction of the elements of image production and demonstrates the application of theoretical principles in the clinical setting.

**PREREQUISITE:** Admission to the program

**COREQUISITE:** RAD_121

**CREDITS:** 3 cr.

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**REQUIRED MATERIALS (CHECK BOOKSTORE FOR LATEST EDITION):**
Click on the bookstore for the campus which you are attending each class.

Pemberton Campus Bookstore
Mount Laurel Campus Bookstore

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**COURSE LEARNING OUTCOMES:**
1. State/define the conditions necessary for x-ray production.
2. Identify and explain processes in x-ray production.
3. Identify characteristics of x-ray emission.
4. Discuss the clinical significance of the photoelectric and modified scattering interactions in diagnostic imaging.
5. Explain latent image formation.
6. Identify and explain x-ray interactions with matter.
7. Describe the basics of computers: hardware, software, data, binary machine code, CPU, ALU, control unit, RAM, and ROM.
8. Describe the basic function of various memory storage and input and output devices
9. Explain the basic function of an array processor
10. Describe the process of digital image data acquisition
11. Describe the effects of frequency, contrast, and noise on digital image quality
12. Describe the function of digital image window level and width controls.
13. Describe various digital radiography image receptor and detector systems
14. Explain critical elements used in the different digital radiography systems
15. Discuss limitation inherent in each of the current available digital radiography systems.
16. Describe the process by which the digital radiography histogram is acquired and the display algorithm is applied to the collected data.
17. Explain why digital radiography systems have significantly greater latitude than conventional film-screen radiography systems.
18. Analyze elements of digital radiography systems that make them prone to violation of ALARA radiation protection concepts.
19. Explain the causes of several digital radiography artifact problems.
20. Discuss advantages of PACS in a medical imaging department
21. Explain why a PACS network may require a separate computer network from the one used throughout an institution.
22. Describe the various types of laser printers
23. Explain soft copy monitor display parameters
24. Identify types of storage available for digital images
25. Discuss the necessity for DICOM in medical imaging
26. Describe the function of each component of radiographic film
27. State the purpose, explain the construction and demonstrate usage of intensifying screens.
28. Select the most appropriate intensifying screen for given clinical situations.
29. Explain the classifications of intensifying screens and the applications for each.
30. Differentiate between traditional intensifying screens and photostimulable phosphors.
31. Identify procedures that ensure a long screen life devoid of artifacts and distortion.
32. State the purpose, explain the construction and demonstrate usage of radiographic film.
33. Demonstrate knowledge of safe film handling and storage.
34. Identify and explain the construction of various film holders.
35. List image archiving options
36. Describe the operation and utilization of dry processing.
37. Describe legal requirements of film identification.
38. Identify and explain various digital artifacts.
39. Explain the concept and components of sensitometry.
40. Demonstrate knowledge of the prime factors in radiographic image formation; mA, time, kV, distance.
41. Describe the features of the characteristic curve and explain its purpose.
42. Compare the characteristic curve for differing types of image receptors, both film and photostimulable phosphors plates.
43. Identify the components of image analysis.
**GENERAL EDUCATION OUTCOMES IN THIS COURSE:**

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<th>Written and Oral Communication: Communication</th>
<th>* Students will logically and persuasively support their points of view or findings.</th>
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<td>Quantitative Knowledge and Skills: Mathematics</td>
<td>* Students will analyze data to solve problems utilizing appropriate mathematical concepts.</td>
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<td>* Students will logically solve problems using the appropriate mathematical technique.</td>
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<td>Scientific Knowledge and Reasoning: Science</td>
<td>* Students will understand and employ the scientific method of inquiry to draw conclusions based on verifiable evidence.</td>
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<td>* Students will explain the impact of scientific theories, discoveries, or technological changes on society.</td>
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<td>* Students will demonstrate critical thinking skills in the analysis of scientific data.</td>
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<tr>
<td>Society and Human Behavior: Social Science</td>
<td>* Students will demonstrate a general knowledge of political, social and economic concepts and systems and their effects on society.</td>
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<td>Technological Competency or Information Literacy: Technology</td>
<td>* Students will demonstrate competency in office productivity tools appropriate to continuing their education.</td>
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<td>Global and Cultural Awareness: Diversity</td>
<td>* Students will be able to compare and contrast cultural norms from diverse populations.</td>
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**TOPICAL OUTLINE FOR THE COURSE:**

Introduction to radiography practices & their purposes
Physiology & types of vision
Image perception processes
The X-ray Tube, X-ray production
X-ray interaction with matter
Introduction to radiographic film
Film types
Intensifying screen intro
Intensifying screen construction
Film/screen combinations
Darkroom construction
Processing chemicals
Silver recovery systems
Radiographic quality
Sensitometry Sensitometric equipment
Film characteristics
Patient as a beam emitter
Remnant vs. scatter radiation
**Course Activities:**

- **Writing assignments:** students will analyze current issues in the field using current articles from the popular press as well as library research including electronic resources databases.

- **Speaking assignments:** students will present research individually or in groups using current technology to support the presentation (e.g., PowerPoint presentation); students will participate in discussions and debates related to the topics in the lessons. Discussions may also focus on cross-cultural and legal-ethical dilemmas as they relate to the course content.

- **Simulation activities:** Trends and issues will analyzed for their ethical as well as social or legal significance. Students might role-play common situations for classmates to analyze. Current news articles may be used to generate discussion.

- **Case Studies:** Complex situations and scenarios will be analyzed in cooperative group settings or as homework assignments.

- **Lectures:** This format will include question and answer sessions to provide interactivity between students and instructor.

- **Speakers:** Representatives from various related fields may be invited to speak.

- **Videos:** Related topics will provide impetus for discussion.

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**Educational Technology:**

Burlington County College advocates a technology enhanced teaching and learning environment. Advanced technological tools may be used in any course section to facilitate instruction. Many of our sections are web-enhanced, which means that some of your work will be submitted or completed online. Web enhancements may include online materials, grade books, testing and quizzes and assignment submission. Many students enjoy the flexibility and convenience that these online enhancements have provided, however if you have concerns about the technology involved, please speak to your instructor immediately.
**Student Evaluations:**

The student will be evaluated on the degree to which student learning outcomes are achieved. A variety of methods may be used such as tests, quizzes, class participation, projects, homework assignments, presentations, etc.

See individual instructor’s course handouts for grading system and criteria (point value for each assessment component in course, e.g. tests, papers, presentations, attendance etc.), number of papers and examinations required in the course, and testing policy including make ups and/or retests.

**Grading Standard:**

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<tr>
<th>Grade</th>
<th>Description</th>
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<tr>
<td>A</td>
<td>Mastery of essential elements and related concepts, plus demonstrated excellence or originality.</td>
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<tr>
<td>B+</td>
<td>Mastery of essential elements and related concepts, showing higher level understanding.</td>
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<tr>
<td>B</td>
<td>Mastery of essential elements and related concepts.</td>
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<tr>
<td>C+</td>
<td>Above average knowledge of essential elements and related concepts.</td>
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<tr>
<td>C</td>
<td>Acceptable knowledge of essential elements and related concepts.</td>
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<tr>
<td>D</td>
<td>Minimal knowledge of related concepts.</td>
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<tr>
<td>F</td>
<td>Unsatisfactory progress. This grade may also be assigned in cases of academic misconduct, such as cheating or plagiarism, and/or excessive absences.</td>
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For other grades, see the current BCC catalog.

**College Policies:**

The current college catalog and student handbook are important documents for understanding your rights and responsibilities as a student in the BCC classroom. Please read your catalog and handbook as they supplement this syllabus, particularly for information regarding:

- Academic Integrity Code
- Student Conduct Code
- Student Grade Appeal Process

**Notification:**

Burlington County College offers reasonable accommodations and/or services to persons with disabilities. The Student Support Services Department offers comprehensive services to all students with any form of disability which hinders their academic success as long as the student provides appropriate documentation. Contact Student Support Services at Extension 1208 at (609) 894-9311 or visit the website at:

http://www.bcc.edu/pages/209.asp
**ADDITIONAL SUPPORT/LABS:**

BCC provides academic advising, student support personal counseling, transfer advising, and special accommodations for individuals with disabilities free to all students through the Division of Student Services. For more information about any of these services, visit the Parker Center on the Pemberton Campus or Laurel Hall on the Mt. Laurel Campus, or call (609) 894-9311 or (856) 222-9311, then dial the desired extension:

- Ext. 1557 Academic Advisement and Counseling
- Ext. 1803 Special Populations
- Ext. 2737 Transfer Center

Or visit the following websites:

- Transfer Center: [http://www.bcc.edu/pages/185.asp](http://www.bcc.edu/pages/185.asp)

BCC offers a free tutoring for all currently enrolled students. For more information regarding The Tutoring Center call Extension 1495 at (609) 894-9311 or (856) 222-9311 or visit the Tutoring Center Website at [http://staff.bcc.edu/tutoring/](http://staff.bcc.edu/tutoring/)

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