



# BAKER COLLEGE

## STUDENT LEARNING OUTCOMES

RDT2310 & RDT2310L Imaging and Processing  
in Radiation Oncology and lab

4 Semester Credit Hours

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1. Explain the components of imaging.
  - a. Define terminology associated with digital imaging systems.
  - b. Describe the various types of digital receptors.
  - c. Discuss the fundamentals of digital imaging.
  - d. Identify the image acquisition, including detector mechanism, initial image processing, histogram analysis, automatic rescaling, and exposure index determination for digital imaging.
  - e. Describe or identify the exposure indices used and their relationship to background and scatter radiation.
  - f. Relate the various image processing employed for digital images to image appearance.
  - g. Identify the primary uses of the simulation display workstation, treatment planning display and treatment unit workstation.
  - h. Explore the historical prospective of conventional simulators.
2. Relate technical factors related to imaging.
  - a. Apply the fundamental physical principles of exposure to digital detectors.
  - b. Select technical factors and systems to ensure appropriate receptor exposure levels for digital detectors.
  - c. Examine the potential impact of digital imaging systems on ALARA (the as low as reasonably achievable) concept.
  - d. Analyze relationships of factors affecting image contrast, density and resolution to determine optimal image quality.
3. Explain how other imaging modalities impact radiation therapy.
  - a. Explain the basic principles of image formation for each of the following modalities: MR, ultrasound and nuclear medicine.
4. Demonstrate basic patient set-up skills.
  - a. Level a patient and set the SSD (Source to Skin Distance)
  - b. Demonstrate correct use of pendant and table functions.
  - c. Use immobilization devices appropriately.
5. Acquire a quality image.
  - a. Use appropriate means of scatter control.
  - b. Explain histogram analysis errors and quantum mottle.
  - c. Apply techniques to enhance image details and reduce image distortion.
6. Relate the importance of quality assurance and maintenance to imaging.

- a. Analyze images for errors and quality.
  - b. Describe artifact types to include causes and preventative measures in imaging.
  - c. Identify components of a Picture Archive and Computer System (PACS) system and its function in imaging modalities.
  - d. Describe patient benefits gained through the use of telemedicine.
  - e. Describe data flow for a Digital Imaging and Communications in Medicine (DICOM) image from an imaging modality to a PACS.
  - f. Describe HIPAA concerns with electronic information.
  - g. Identify common problems associated with retrieving/viewing images.
  - h. Utilize acquisition precautions to avoid poor quality images.
7. Analyze the computed tomography (CT) imaging system in radiation therapy.
- a. Explore the components of the computed tomography (CT) imaging system to determine function and use.
  - b. Differentiate between conventional and spiral/helical CT scanning.
  - c. Outline the CT computer data processing steps.
  - d. Describe the functions of the array processor used for image reconstruction.
  - e. Explain the difference between reconstructing and reformatting an image.
  - f. Describe the application of the terms related to CT.
  - g. Identify the types and appearance of artifacts most commonly affecting CT images.
  - h. Explain how artifacts can be reduced or eliminated.
  - i. Explore data storage techniques used in CT.
  - j. Investigate the application of radiation protection devices used to reduce patient dose in CT.
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## **Big Ideas and Essential Questions**

### **Big Ideas**

- Digital Imaging and Acquisition
- Principles of Exposure
- Quality Assurance (QA) and Maintenance Issues
- Imaging Equipment
- Other Imaging Modalities
- Basic Clinical Skills
- Radiation Safety

### **Essential Questions**

1. What impact does imaging have on radiation therapy?
  2. What is the importance of quality assurance related to imaging?
  3. How do other imaging modalities impact radiation therapy?
  4. What is the importance of proper patient set up?
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**Note:** The student must pass the skills assessment portion of the lab final in order to progress within the program.

These SLOs are not approved for experiential credit.

**Effective: Fall 2017**