Computed radiography physics

Abstract:
Computed radiography (CR) systems are becoming prevalent in diagnostic radiology as the availability of lower cost devices and the increased emphasis on digital image networks in radiology occurs. Basic knowledge of the CR system and an understanding of system characteristics by the radiologist, physicist, and technologist are important for the installation and operation of these devices in the clinical environment.

Course content:
The process of photostimulated luminescence, creation of the latent image, and acquisition of the digital image are reviewed. CR detector performance issues are explained, including the characteristic curve and dynamic range response, amplification and scaling of the electronic latent image, spatial resolution / sampling rate relationships, and contrast detectability related to bit depth and image noise. Radiation dose requirements of CR and "appropriate" exposures for typical imaging procedures are presented. Post processing capabilities, anatomic parameter settings, hardcopy and softcopy displays, image size, and network interfaces are examined. Finally, acceptance testing and quality control protocols to ensure optimal and consistent performance are recommended.

Learning objectives:
The attendee of this course can expect to learn several key issues regarding computed radiography:
1.	Functional aspects of the CR system.
2.	Understanding the benefits and limitations of CR compared to screen-film detectors.
3.	Implementation of image processing parameters and acquisition protocols for CR.
4.	Optimization of hard and soft-copy images for CR.
5.	Determination of incident exposures on the imaging plate in order to identify under/overexposures.
6.	Acceptance testing and periodic quality control procedures to ensure long-term operational stability and function.