Spiral CT scanners have seen dramatic developments in the past year. Though twin detectors and rotation times of less than a second were previously available, current systems now offer *both* multi-detectors systems (2 and 4 with pathways to 8, 16 and 34) and rotation times down to .5 second. These improvements combined with increased X-ray tube heat capacity and faster image reconstruction times demonstrate that Spiral CT continues to undergo rapid changes that are increasing the ability to quickly and continuously acquire a large volume of image data. This has led to significant improvements in diagnostic imaging methods, such as: volumetric acquisition and 3-D display of image data; improved vascular imaging and CT angiography (CTA), single breathhold thoracic scans which avoid breathing misregistration; and rapid acquisition of contrast enhancement protocols that allow tissues to be imaged during different phases of enhancement (arterial, venous and parenchymal). Finally, the choice of operational parameters (such as slice thickness, table speed and reconstruction interval) affect image quality and/or patient radiation dose and become even more complex in multiple detector systems. Because of these developments, basic knowledge of spiral CT and an understanding of the design and operational characteristics are becoming essential for physicists, radiologists and technologists.

The educational objectives of this course are to:

(1) Define Spiral CT and some affiliated terms (pitch, reconstruction interval and interpolation algorithm) for both single and multiple detector systems.
(2) Describe the basic differences between conventional axial CT and spiral CT in how data is acquired and how images are formed.
(3) Describe some of the recent developments in multi-detector systems with subsecond rotation times and how these concepts affect image formation.
(4) Discuss the implications of Spiral CT on clinical usage (volumetric acquisitions, vascular imaging, single breathhold thoracic scans, etc.).
(5) Describe the effects of Spiral CT scanning and the selection of operational parameters on image quality and radiation dose; compare and contrast these effects for single and multiple detector systems.
(6) Discuss possible future developments in Spiral CT.