In recent years, CT Simulation has emerged as a new simulation modality which efficiently combines the use of CT images for structure localization and virtual simulation for treatment field design. The purpose of this course is to discuss a variety of issues pertinent to the clinical implementation of CT simulation. General issues which will be discussed include:

    1. The process of CT simulation and how it differs from conventional simulation.
    2. Acceptance testing and clinical evaluation of CT simulation systems.
    3. Design and implementation of site-specific scanning protocols, imaging techniques, and virtual simulation procedures.
    4. Quality assurance of CT simulation systems

The process of CT simulation differs in significant ways from conventional simulation. Therefore, implementation of CT simulation often requires a change in the division of labor and basic functioning of the simulation and treatment planning sections of a department. Training of technical staff and physicians primarily by physics personnel is crucial to the success of the system. Site-specific scanning and imaging protocols tailored to meet the institution's needs must be developed in addition to virtual simulation procedures for a variety of sites and treatment techniques.

Methods for evaluating scanning protocols and DRRs will be presented. Site-specific CT simulation procedures will be discussed for common clinical situations to demonstrate the strengths and limitations of current systems. Examples for routine cases, cases involving field matching and electron fields will be presented. The use of some of the more advanced features of current systems such as multi-modality image registration and the use of non-traditional projection and 3D images will also be discussed.

Educational Objectives:

    1. To become familiar with the process of CT simulation and how it differs from conventional simulation.

    2. To understand the technical strengths and limitations of CT simulation and ways to develop protocols and procedures necessary for clinical implementation.

    3. To understand tests used for acceptance testing and quality assurance of CT simulation systems