AbstractID: 9822 Title: DICOM: What the Physicist Needs to Know

The DICOM (Digital Imaging and Communications in Medicine) standards are a complex set of instructions to exchange and present medical image information. Prior to establishment of the standards, the exchange of medical images between two devices required exceptional effort and a prodigious understanding of computing. Today we find that complete interoperability of two devices claiming conformance to the DICOM standards is not guaranteed, but basic connectivity has been greatly simplified. This course aims to remove the mystery surrounding the parts of the standard that have an impact on image quality or availability of digital images and information. We will examine the DICOM committee's object-oriented approach and give real-life meaning to terms such as "Information Object Definition (IOD)" and "Service-Object-Pair (SOP) Class" with an emphasis on using this knowledge to solve specific problems. DICOM conformance statement evaluation will be presented along with DICOM services such as Storage, Worklist Management, Print, Query/Retrieve, Storage Commitment, Softcopy Presentation State, and Modality Performed Procedure Step in the context of obtaining new equipment and utilizing current equipment in a digital environment. Challenges with creating and reading DICOM Part 10 Media Storage CD/DVDs will be addressed as well as the DICOM Part 14 Grayscale Standard Display Function (GSDF) which provides a mechanism for consistent image appearance among different media types (monitors, film, and paper). Finally, a thorough review of public-domain and freely available tools will be given along with practical examples of their use and flexibility.

Educational Objectives
1. Gain an overview of the history and nature of the DICOM standards.
2. Understand which DICOM services/standards have an effect on diagnostic image quality and availability.
3. Understand how to configure and utilize services/standards which influence image quality and availability.
4. Understand how to obtain and utilize freely available tools for manipulation of DICOM images and information.