The objective of this course is to provide fundamental information and concepts on integrated access to medical images, existing standards and the application of computerized imaging in Cardiology. The models and physical principles of image formation of the main modalities in Cardiology, namely, X-ray, Tomography, Magnetic Resonance Imaging, Ultrasound, Optical Coherence Tomography (OCT) and Nuclear Medicine will be addressed, in addition to the basic knowledge in digital image processing, such as discretization, contrast, filtering, compression, tomography and quantification, that will be provided in the course as well. Modern concepts of integrating clinical information with images will also be developed, especially PACS (Picture Archiving and Communication Systems).

With the constant improvement of diagnostic and therapeutic methods, the use of medical devices involving images has increased dramatically. A better understanding of the limitations and potentialities of medical imaging equipment and of image processing techniques is therefore important for better use of the data. Another important aspect to consider is the awareness of the effect of parameters involved in digital processing, such as the type of filters, cutoff frequency, etc. that may substantially alter the result and consequently the diagnosis.

1. Introduction: Course Overview; Evaluation criteria; Digital images: basic concepts on resolution, quantization, contrast, digital filters; Medical imaging formation: physical principles and models; 2. PACS: Picture Archiving and Communication Systems; Basic Concepts; Image Compression; Visualization techniques; Integration of medical information; Information volume: transmission and storage; PACS modeling; Multi-modal studies; 3. X-ray and Tomography: Physical principles of image formation; Tomographic Reconstruction; Clinical Applications 4. Ultrasound: Physical principles of image formation; Clinical Applications 5. Nuclear Medicine: Physical principles of image formation; Clinical Applications 6. Magnetic Resonance: Physical principles of image formation; Clinical Applications 7. Optical Coherence Tomography: Physical Principles of Image Formation; Clinical Applications
Assessment Method:

Students will be assessed on the basis of an individual paper.

Observation:

Minimum number of students: 05 Maximum number of students: 25

Bibliography: