

醫用超音波原理

Principles of Medical Ultrasonics

Objective: Introduce basic principles of diagnostic ultrasound imaging systems. Clinical applications, design considerations and recent progress in the ultrasound industry will also be discussed.

Textbooks: 1. Class notes.
2. “Diagnostic Ultrasound Imaging: Inside Out” by Thomas L. Szabo, Elsevier Academic Press, 2004.

Prerequisites: Mathematics

Topics:

1. Overview of Diagnostic Ultrasonic Imaging Systems.
2. Acoustic Wave Propagation.
3. Scattering, Attenuation and Speckle.
4. Transducers - Generation and Detection of Ultrasound.
5. Diffraction and Beam Formation Using Arrays.
6. Real-Time Image Formation.
7. Contrast Resolution.
8. Color and Spectral Doppler.
9. Doppler Ambiguity Function.
10. Ultrasound Contrast Agents
11. Opto-Acoustic Imaging.

Grading: 40% Computer Homeworks (MATLAB Programming)
30% Written Exam 1 (open book)
30% Written Exam 2 (open book)

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