

Course Title	Medical Imaging - Diagnostic Ultrasound				
Course Code	<b>MMK 535</b>				
Course Type	ELECTIVE				
Level	MASTER/PHD				
Year / Semester	WINTER SEMESTER				
Teacher's Name	MICHALIS AVERKIOU				
ECTS	8	Lectures / week	3 hours weekly	Laboratories / week	4 total per sem.
Course Purpose and Objectives	The purpose of the course is to introduce students to diagnostic ultrasound and teach basic physical principles of ultrasound imaging. It also aims to explain imaging modalities of modern ultrasound scanners.				
Learning Outcomes	<p>The students will be able to</p> <ul style="list-style-type: none"> <li>• explain the physical principles behind diagnostic ultrasound.</li> <li>• create ultrasound beams in water</li> <li>• perform ultrasound hydrophone measurements</li> <li>• read and understand ultrasound images</li> <li>• identify and interpret b-mode, color flow, pulsed wave Doppler, and color power angio images</li> <li>• measure flow velocity with the Doppler technique</li> </ul>				
Prerequisites	NO	Required	NO		
Course Content	<p>This course covers the basic science and physics of diagnostic ultrasound. A short introduction to the relevant acoustics needed for ultrasound imaging is given first. It includes reflection and transmission, refraction, acoustic impedance, sound beams, arrays, beamforming, ultrasound propagation through tissue and blood, attenuation, scattering, and nonlinear properties of tissues. The current equipment technology is presented and explained. The following modes of imaging are covered: M-mode, B-mode, Doppler, Harmonic Imaging, and 3D imaging. Emphasis is also placed on ultrasound contrast agents and specifically imaging and quantification of tumor angiogenesis. The course includes a laboratory component that covers some of the topics above. In laboratory exercises, students use a modern diagnostic ultrasound scanner and also observe clinical examinations.</p>				
Teaching Methodology	<p>Lectures 3 hours per week / Tutorials or laboratory exercises 1 hour per week</p> <p>Weekly lectures, homework, and laboratory exercises at the Biomedical Ultrasound Laboratory of the department.</p> <p>There is continuous communication with the instructor and active participation of the students in the class.</p> <p>During the first week of the semester the instructor hands in the Syllabus of the course to the students, which includes all information about the</p>				

	materials covered by the course, the learning outcomes, the evaluation and the office hours.
Bibliography	T. L. Szabo, Diagnostic Ultrasound Imaging – Inside Out, Elsevier
Assessment	Homework/projects (25%), midterm exam (35%), final exam (40%)
Language	GREEK OR ENGLISH