

Course Title	Biomedical and Industrial Applications of Engineering Acoustics				
Course Code	<b>MMK 533</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 the teaching of the acoustics involved in biomedical ultrasound.				
Learning Outcomes	<p>The students will be able to</p> <ul style="list-style-type: none"> <li>• to explain the physical phenomena involved in ultrasound propagation in the body.</li> <li>• to explain sound dissipation in fluids and tissue</li> <li>• know how to use function generators and oscilloscopes to digitize waveforms.</li> <li>• create and measure ultrasound waves.</li> <li>• solve graphically initial and boundary value problems of waves.</li> <li>• measure ambient sound with sound pressure level meters.</li> </ul>				
Prerequisites	NO	Required	NO		
Course Content	<p>This course is an introduction to physical acoustics for engineering and science majors. It gives the physical basis for problems found in many engineering applications including biomedical ultrasound, room acoustics, noise control and sonar. This course covers: plane waves in fluids, transient and steady-state reflection and transmission, refraction, strings and membranes, rooms, absorption and dispersion, spherical and cylindrical waves, radiation from baffled piston, and medical ultrasound arrays. The course includes laboratory sessions on ultrasound beams with usage of related equipment such as function generator, digital oscilloscope, power amplifier, and micropositioners. Sound pressure level measurements for noise control are also taken with an SPL meter</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 materials</p>				

	covered by the course, the learning outcomes, the evaluation and the office hours.
Bibliography	D. T. Blackstock, Fundamentals of Physical Acoustics, Wiley-Interscience, New York, 2000.
Assessment	Homework/projects (20%), midterm exam (35%), final exam (45%)
Language	GREEK OR ENGLISH