Course Title	**Vibrations**				
Course Code	**MME 227**				
Course Type	Compulsory				
Level	Undergraduate				
Year / Semester	2nd Year / 4th Semester				
Teacher's Name	Andreas Kyprianou				
ECTS	6	Lectures / week	3+1 hours	Laboratories / week	6 hours total
Course Purpose and Objectives	The purpose of the course is to give an introduction to vibration engineering and discuss its importance in real life applications.				
Learning Outcomes	• Recognize the sources and causes of vibration as well as the conditions under which a mechanical system oscillates. • Apply mathematical concepts drawn from real and complex analysis, linear algebra, Fourier transforms and differential equations for analyzing and understanding vibrating systems. • Find the time response of free and forced vibration systems. • Find the natural frequencies and mode shapes of two degree of freedom systems. • Understand the role of mechanical engineers in society as technology creators. • Recognize that vibrations can be exploited in novel multidisciplinary applications; much the same way the atomic force microscope exploits cantilever vibrations to probe nanoscale.				
Prerequisites	MAS 025, MME 225	Required	None		
Course Content	This is an introductory course on mechanical vibrations. One degree of freedom systems are used to explain: (a) the basic principles of modelling, (b) the second order differential equations that modelling yields, and (c) the relationship between the system physical parameters and the differential equations. The notions of (un)damped natural frequency and resonance are defined using the system parameters and their real-life importance is thoroughly discussed. Two degree of freedom systems are studied in order to define the concept of mode shape. Computation of mode shapes and natural frequencies of two degree of freedom systems. Computation of the frequency response function of forced two degree of freedom systems. **Laboratory Exercises** • Responses of free undamped and damped systems • Free bending vibration and natural frequency determination • Forced vibration and experimental determination of frequency response functions				

Teaching Methodology	• Lectures and discussion of solved examples • Communicative, Collaborative • Laboratory exercises • During the first week of the semester, the Syllabus of the course is given by the teacher, which includes information on the course content, expected learning outcomes, assessment and office hours
Bibliography	• Rao, S.S., *Mechanical Vibrations*. Prentice Hall.
Assessment	• Homework 5% • Laboratory 15% • Midterm exam 30% • Final exam 50%
Language	Greek