

Course Title	Machine Elements				
Course Code	MME 345				
Course Type	Compulsory				
Level	Undergraduate				
Year / Semester	3 rd Year / 5 th semester				
Teacher's Name	Loucas Louca				
ECTS	6	Lectures / week	3+1 hours	Laboratories / week	6 hours total
Course Purpose and Objectives	To teach methodologies for the calculation, selection and use of components (machine elements) that are used in mechanical systems, under static and dynamic loading conditions. By the end of the course the students will be able to design a machine with mechanical components taught in the course.				
Learning Outcomes	<ul style="list-style-type: none"> • Implement theories of material failure under static and dynamic loading conditions for various machine elements. • Select and dimension the following components under real operating conditions: <ul style="list-style-type: none"> ◆ Shafts and shaft elements ◆ Screws and nonpermanent joints ◆ Welding and permanent joints ◆ Springs ◆ Roller/Journal bearings ◆ Gears • Design and perform the selection of components and material for a real mechanical system and build its three-dimensional model using SolidWorks. 				
Prerequisites	MME 257	Required	None		
Course Content	<p>The course will teach methods for the calculation, selection and use of components (machine elements) required in mechanical engineering. The course first introduces engineering design principles, while also reinforcing students' understanding of material properties, load and stress analysis, deformation and elasticity, and theories of material failure under static and dynamic loads. Subsequently, the main machine elements, their properties and selection procedure are defined. The machine elements studied include: shafts; screws/nonpermanent joints; welding/permanent joints; springs; roller/journal bearings, gears. The course includes a team project to design an engineering device and create its 3D geometric model on a computer.</p> <p>Laboratory Demonstrations</p> <ul style="list-style-type: none"> • Experimental setups for hands-on experience and demonstrations of the machine elements taught in this course • Demonstration of spur, helical and worm gear units • Disassembly/Assembly of gearbox 				

Teaching Methodology	<ul style="list-style-type: none"> • Lectures using PowerPoint • Recitation for solving sample problems • Homework • Laboratory exercises • Office hours • Team project for the design of real mechanical system • During the first week of the semester, the course syllabus is given to students, which includes information on the course content, expected learning outcomes, assessment and office hours.
Bibliography	<ul style="list-style-type: none"> • Budynas, R.G. and J.K. Nisbett, <i>Shigley's Mechanical Engineering Design, 9th Edition in SI Units</i>. McGraw-Hill, ISBN 978-0071328401. • Mott, R., 1999, <i>Machine Elements in Mechanical Design</i>. Prentice Hall, ISBN 0138414467. • Shigley, J.E., <i>Mechanical Engineering Design: Metric Edition</i>. McGraw-Hill, ISBN 0070568987. • Norton, R.L., <i>Machine design: an integrated approach</i>. Prentice Hall, ISBN 9780133356717.
Assessment	<ul style="list-style-type: none"> • Team Project 15% • Midterm Exam 40% • Final Exam 45%
Language	Greek