

Course unit title:	Machine Elements I		
Course unit code:	ME316		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (2st Cycle)		
Year of study:	3		
Semester when the unit is delivered:	5 th (Spring)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Antonios Lontos		
Learning outcomes of the course unit:	<ul style="list-style-type: none"> • Explain general mechanical concepts related to machine elements. • Analyse loads, stresses and deformation. Explain theories about failure and fatigue of machine components. • Calculate machine elements loaded under static or dynamic loading. • Design machine component on shafts. Make calculation for the selection of proper shafts. • Design and calculate bearings. Select proper bearing for machines. • Design and calculate screws and fasteners. • Calculate welds and select proper welding parameters. • Design and calculate cams and flywheels. 		
Mode of delivery:	Face-to-face		
Prerequisites:	ME219	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	<ul style="list-style-type: none"> • General concepts on machine design: Stress and strength, stress concentration, Static strength, Plastic deformation. • Static and dynamic loading of machine elements: Fatigue, Theories of failure, Failure prevention, Static and dynamic strength of machine elements. • Shafts: Calculation of shafts, Shaft material and critical speeds, Keys and Couplings. • Rolling and sliding bearings: Bearing types, Calculation of bearing, Lubrication and seals, Bearing load and life, Selection of ball and cylindrical roller bearing, Sliding bearings, materials and applications. • Mechanical connections: Screws, Fasteners and Connections. • Welded and bonded Joints: Welding symbols, Stresses in welding, Static and fatigue loading, Specification set. • Cams and flywheels: Calculation of cams and flywheels and applications • Laboratory work: Use of special software for calculating and drawing of various machine element (Autocad, 3D Drawings, Advanced assembly, SolidWorks, Simple Drawings and FEM Simulations, Software for machine elements calculations) 		
Recommended and/or required reading:	None		
Textbooks:	Mechanical Engineering Design, Ch. R. Mischke, J. Edward Shigley, McGraw-Hill Fundamentals of Machine Elements, B. J. Hamrock, B. Jacobson, S. R. Schmid, McGraw-Hill		
References:	Design of Machine Elements and Machines by Jack A. Collins, George H. Staab,		

	<p>Henry R. Busby, John Wiley & Sons, 2002</p> <p>Machine Design: An Integrated Approach by Robert L. Norton, Robert L Norton, Prentice Hall, 2nd edition, 2000</p> <p>Machine Elements in Mechanical Design by Robert L. Mott, Prentice Hall, 3rd edition, 1998</p>
Planned learning activities and teaching methods:	Lectures, laboratories and tutorials are used in this subject and assignments are performed to evaluate the students understanding of the subject matter. A description is given at the beginning of the course in order for the students to get enough information on the main subjects of the course.
Assessment methods and criteria:	<ul style="list-style-type: none"> • Assignments: 40% • Final Exam: 60%
Language of instruction:	English
Work placement(s):	No