Course Title	Machine Elements I				
Course Code	ME316				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	3rd Year / 5th Semester				
Teacher's Name	Dr. Antonios Lontos				
ECTS	6	Lectures / week	3	Laboratories/week	1
Course Purpose	The purpose of the course is to learn how calculate various machine elements using established procedures, select machines elements from a wide variety of libraries and finally how to design real engineering mechanisms or machines.				
Learning Outcomes	By the end of the course, students must be able to: 1. Explain general mechanical concepts related to machine elements. 2. Analyze loads, stresses and deformation. Explain theories about failure and fatigue of machine components. 3. Calculate machine elements loaded under static or dynamic loading. 4. Design machine component on shafts. Make calculation for the selection of proper shafts. 5. Design and calculate bearings. Select proper bearing for machines. 6. Design and calculate screws and fasteners. 7. Calculate welds and select proper welding parameters. 8. Design and calculate cams and flywheels.				
Prerequisites	ME214	Corequisites	None		
Course Content	• 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)
Teaching Methodology	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.
Bibliography	(a) Textbooks: • Mechanical Engineering Design, Ch. R. Mischke, J. Edward Shigley, McGraw-Hill (b) References: • Fundamentals of Machine Elements, B. J. Hamrock, B. Jacobson, S. R. Scmid, Mcgraw-Hill • Design of Machine Elements and Machines by Jack A. Collins, George H. Staab, Henry R. Busby, John Wiley & Sons, 2002 • Machine Design: An Integrated Approach by Robert L. Norton, Robert L Norton, Prentice Hall, 2nd edition, 2000 • Machine Elements in Mechanical Design by Robert L. Mott, Prentice Hall, 3rd edition, 1998
Assessment	The assessment consists of following methods for both the theoretical and practical part of the course. Each assessment method is assigned with a weight which is used for the calculation of the final grade. Assignments: 40% Final Exam: 60%
Language	English