

Course unit title:	Machine Elements II		
Course unit code:	ME317		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (2 <sup>nd</sup> Cycle)		
Year of study:	3		
Semester when the unit is delivered:	6 <sup>th</sup> (Spring)		
Number of ECTS credits allocated :	6		
Name of lecturer(s):	Dr. Antonios Lontos, Unit leader: Dr. Sotiris Omirou		
Learning outcomes of the course unit:	<ul style="list-style-type: none"> <li>• Design and calculate gears. Calculate forces on gears.</li> <li>• Design and calculate spur and helical gears.</li> <li>• Design and calculate bevel and worm gears.</li> <li>• Design and calculate mechanical springs (load, stresses, selection of material). Apply mechanical springs on machines and engineering mechanisms.</li> <li>• Calculate clutches and brakes.</li> <li>• Calculate and design power transition systems using belts.</li> <li>• Calculate roller chains, wire ropes, flexible shafts.</li> </ul>		
Mode of delivery:	Face-to-face		
Prerequisites:	ME316	Co-requisites:	None
Recommended optional program components:	None		
Course contents:	<ul style="list-style-type: none"> <li>• <b>Various types of Gear:</b> – General, Introduction to gears, Types of gears, Tooth system, Contact ratio, Force analysis, Applications of gear design and power transmission in mechanical drives.</li> <li>• <b>Spur and Helical Gears:</b> Calculations, Force analysis, stresses, strains, geometry, applications, drawings.</li> <li>• <b>Bevel and Worm Gears:</b> Calculations, Force analysis, stresses, geometry, applications.</li> <li>• <b>Mechanical Spring:</b> Various types and applications of springs, Stresses in helical springs, Deflection of helical springs, Extension and Compression springs, Springs material, Fatigue loading, Design of springs, Miscellaneous springs.</li> <li>• <b>Clutches and Breaks Brake:</b> Geometry and operations analysis, Band-type clutches and brakes, Energy consideration, Temperature rise, Friction materials.</li> <li>• <b>Power transmission components:</b> Competition of the design of a power transmission, Flat belts, Roller chain, Wire rope, Flexible shaft.</li> <li>• <b>Laboratory work:</b> 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)</li> </ul>		
Recommended and/or required reading:	None		
Textbooks:	Fundamentals of Machine Elements, B. J. Hamrock, B. Jacobson, S. R. Schmid, McGraw-Hill Mechanical Engineering Design, Ch. R. Mischke, J. Edward Shigley, McGraw-Hill		
References:	Mechanical Design, An Integrated Approach, Ansel C. Ugural, McGraw Hill, 2004.		

	<p>Design of Machine Elements and Machines, Jack A. Collins, George H. Staab, Henry R. Busby, John Wiley &amp; Sons, 2002</p> <p>Mechanisms and mechanical devices by Neil Clater, Nichocals P. Chironis, Third Edition 2001</p> <p>Fundamental of Machines Components Design, Robert C. Juvinall, Kurt M. Marshek, Third Edition, 2000</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:	<p>Lectures, laboratories and tutorials are used in this subject and assignments are performed to evaluate the students understanding of the subject matter.</p> <p>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.</p>
Assessment methods and criteria:	<ul style="list-style-type: none"> <li>• Tests: 40%</li> <li>• Final Exam: 60%</li> </ul>
Language of instruction:	English
Work placement(s):	No