

Course title: Analytical Methods in Tribology	Neptun code: GEGET419-a
Course coordinator: Prof. Dr. Gabriella Vadászné Bognár, professor, DSc	
type and number of lesson: lecture/seminar 2 / week or 28 /semester	
method of accountability: colloquium /practical mark/other	
curriculum location of the subject: autumn/spring	
pre-study conditions:	
The task and purpose of the subject:	
<p>The aim is to investigate some of the phenomena of friction at the various machine parts connection pairs, which determines the load capacity, lifetime and reliable operation of the mechanical, mechatronic devices that move under load on each other, understanding the methods of friction and wear processes, an analysis of the efficient management of friction and wear, especially considering the quality of the surfaces involved and the rheological characteristics of the lubricants. The aim of the course is to interpret different tribological phenomena, to gain a better understanding of analytic and numerical mathematical tools.</p>	
Course description:	
<p>Introduction. Overview of mathematical foundations. The concept of tribology, its task. Elements of the tribological system. Unevenness of technical surfaces. The tribological role and characterization of surface micro geometry. Friction processes, wear mechanisms, wear appearance forms. Rheological characterization of lubricating oils, Newtonian and non-Newtonian fluids. Factors affecting viscosity. Lubrication conditions. The Reynolds equation and its solutions in special cases. Possibilities of planning and regulating tribological processes in light and heavy loads. Solutions for hydrodynamic and thermal EHL (elasto-hydrodynamic lubrication) problems. Factors influencing the formation of lubricious film. Establishing and performing calculation tasks through practical examples</p>	
Required literature:	
<ol style="list-style-type: none"> 1. Kudish, I.I. and Covitch, M.J.: Modeling and Analytical Methods in Tribology. BocaRaton, London, New York: CRC Press, Taylor & Francis Group. 2010.2. 2. Neale, M. J.: The Tribology. Handbook, Butterworth, Oxford, 1995.3. 3. Erdélyi, A.: Asymptotic Expansions. New York: Dover Publications. 1956. 	
Recommended literature:	
<ol style="list-style-type: none"> 1. Bhushan B.: Modern tribology handbook, CRC Press 2000, ISBN: 978-0-8493-8403-5 2. Bhushan B.: Principles and Applications of Tribology, Toronto: John Wileyand Sons Inc. 1999. 	