

Course title: Fundamentals of Machine Component Design	Neptun code: GEGET405-a
Course coordinator: Szabolcs Szávai, associate professor, PhD.	
type and number of lesson: Weekly lecture + seminar hours: 28 (14 x 2/week)	
method of accountability: colloquium	
curriculum location of the subject: autumn/spring	
pre-study conditions:	
The task and purpose of the subject:	
The main objective of this course is to provides rules for the design of general-purpose machine elements such as joints, shafting, coupling & clutches, roller contact and sliding bearings and transmissions.	
Course description:	
The Design Process (Problem identification ,Preliminary ideas, Selection of the best idea, Refinement, Analysis, Implementation) Shafting (Design approach for shafts, Checkout calculations, Fatigue analysis)Fatigue Analysis (Combined static load, Fluctuating load, Wöhler diagram, Fatigue, Endurance limit for a machine element (modification factors, Safety factor, Selection of shape for fatigue)) Power Screws (Efficiency general, Thread, Distribution of forces in a screw-nut mechanism, Torque, Efficiency of a power screw mechanism)Bolted Connections (Load tangent to the plane of contact (loose, fitted bolts), Locking means, preload)Welded Connections (Stress analysis, Design of welded joints) Shaft-Hub Connections (Positive engagement, Connections by friction)Press-fit Connections (Formulation of the problem, Stress and strength analysis, Selection of a fit)Couplings (Equivalent (reflected) inertia, Selection of a coupling, Rigid couplings, Flexible couplings, Elastic couplings)Clutches (Analysis , Friction torque vs. design parameters, Actuation systems, Operating modes)Brakes (A cone brake, Band brakes)Roller Contact Bearings (Roller contact vs. plain surface (journal) bearings, Selection of the service life, Calculation of the equivalent load, Bearing arrangements, Selection of fits, Lubrication and sealing)Friction and Lubrication (Coefficient of friction, Properties of bearing materials, Bearing parameter (the Stribeck curve) The Full-film Lubrication, Reynolds equation)Transmission Systems (Function of a transmission, Infinitely variable transmissions, Pulley Transmissions, Belt tensioning systems, Gear Transmissions)	
Required literature:	
1. Andrzej Golenko; Fundamentals of Machine Design 2010	
Recommended literature:	
1. Juvinal, R. C. - Marshek, K. M.: Fundamentals of Machine Component Design, John Wiley, 2000 2. Shigley J.E.: Standard Handbook of Mechanical Engineering, McGraw Hill BookCompany, 1996 3. Mott R.L.: Machine Elements in Mechanical Design, Prentice Hall, 2003 .	