

The title of the course	Fundamentals of Machine Components Design and Processing
Faculty	Faculty of Mechanical Engineering and Computer Science
The level of studies	Bachelor of Engineering (B.Ing.); first level
Semester	Summer
The form of classes and number of hours	Lecture/Project; 15h/15h
Language of instruction	English
The number of ECTS	2
Teacher	dr inż. Jerzy Kopeć
The aims of the course	The course covers chosen topics connected with design of machine components. The aim is to prepare a student to be able to perform calculations which should be an immanent part of a design process together with technical drawing of these parts. Additionally, standard parts are chosen from international standards (e.g. ISO) and catalogues – also calculations dedicated for these tasks are discussed. The following standard parts are considered screws, bolts and bearings. Other parts considered are e.g.: shafts, clutches, brakes. Some mechanisms/devices are considered e.g. gears and planetary gears. The calculations considered are dedicated to determine versatile parameters e.g. forces, stresses, durability, life time, strains etc.
The content of the course: main topics and key ideas	Review of machine parts. The basic as e.g. shafts, clutches, geared wheels are considered in details. Design rules and adequate calculations are discussed as theoretical ones as well as exemplary parts and machines are considered in details. Several gears are considered cylindrical, bevel and spur gears. Additionally belt drives are considered. Graph-based methods for calculation of gear ratios are added which is a special topic known and developed by the author of the lectures.
Didactics methods	Lectures, discussions, self studying
Course requirements	Attendance/preparation of written report including particular design calculation and particular object e.g. planetary gear.

Literature (basic and supplementary)	<p>1] Hall A.S., Holowenko A.R. and Laughlin H.G.: Machine Design, Schaum Outline Series, McGraw-Hill, New York 1961.</p> <p>2] Ugural A.C.: Mechanical Design, An integrated approach, McGraw-Hill, New York 2004.</p> <p>3] Karwa R.: A textbook of machine design, Laxmi Publ., New Delhi, 2006.</p> <p>4] Bhandari V.B.: Design of machine elements. Tata, McGraw-Hill Education, New Delhi, 2007.</p> <p>5] Colloins J.A., Busby H.R., Staab G.H.: Mechanical Design of Machine Elements and machines, John Wiley and Sons, Hoboken, USA 2010.</p> <p>U1] Jadon V. K., Verma S.: Analysis and Design of Machine Elements. I.K. Intern. Publishing House, New Delhi, 2010.</p> <p>U2] Calalogues of bolts, screws, nuts, bearings etc. – exemplary e.g.:</p> <p>U3] Fasteners. Bolts and nuts. www.fabory.co.ul (open on 15 July, 2014).</p> <p>U4] Online catalogue: www.nsk.com (open on 15 July, 2014).</p>
<p>The effects of the education</p> <ul style="list-style-type: none"> - knowledge - skills - social competences 	<p>Knowledge:</p> <p>She/he knows general principles of engineering design (calculation routines) of chosen machine parts.</p> <p>Student knows standard parts and routines of their choice from catalogues.</p> <p>Skills:</p> <p>Student is able to carry out calculations and use internet files dedicated to standard machine parts.</p> <p>Social competences (depending on number of students):</p> <p>She/he can share calculation tasks.</p> <p>Student recognizes a need of self-education, can share task of browsing through net, checking the references, catalogues and user guides.</p>