

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Basics of drive systems design</b>		Code <b>1010611251010648481</b>
Field of study <b>Mechanical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>3 / 5</b>
Elective path/specialty <b>Heavy Machinery</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>2</b> Classes: <b>1</b> Laboratory: <b>-</b> Project/seminars: <b>2</b>		No. of credits <b>6</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>6 100%</b> <b>6 100%</b>
<b>Responsible for subject / lecturer:</b> dr hab. inż. Ireneusz Malujda, prof. PP email: ireneusz.malujda@put.poznan.pl tel. 61 665-2244 Transport Engineering ul. Piotrowo 3, 60-965 Poznań		<b>Responsible for subject / lecturer:</b> dr inż. Krzysztof Talaśka email: krzysztof.talaska@put.poznan.pl tel. 61 665-2246 Transport Engineering ul. Piotrowo 3, 60-965 Poznań
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
<b>1</b>	<b>Knowledge</b>	Student has knowledge of physics (statics, kinematics and dynamics), mathematics, Basic of machines design I after completing the program of study
<b>2</b>	<b>Skills</b>	Student has the problem-solving skills of the basics of machine design based on their knowledge, ability to obtain the information from identified sources
<b>3</b>	<b>Social competencies</b>	Student understands the need to broaden their competence, willingness to work together as a team
<b>Assumptions and objectives of the course:</b>		
1. Provide students with knowledge of the basics of machine design. 2. Develop students' skills: - calculation and design of components and assemblies of machines, - making and reading the technical documentation on the basis of the knowledge from the Engineering Drawing course - practical use of the knowledge gained from the course: Mechanics, Strength of materials, Theory of machines, Materials, Basics of Machines Design I. 3. Development of students' teamwork skills.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Has basic knowledge of the basics of machine construction and the theory of machines and mechanisms, including mechanical vibrations - [M1_W05] 2. Has basic knowledge of standardized principles of construction record and engineering graphics - [M1_W06] 3. Has basic knowledge in the field of strength of materials, including the basis of the theory of elasticity and plasticity, performance hypotheses, methods for calculating beams, membranes, shafts, connections and other simple structural elements, as well as methods for testing the strength of materials and the state of strain and stress in mechanical constructions - [M1_W11]		
<b>Skills:</b>		

<p>1. Is able to plan and carry out the process of constructing uncomplicated machine sets or machines and to formulate requirements for electronic components and automatic control systems for industry professionals in mechatronic systems - [M1_U14]</p> <p>2. Student is able to perform basic functional and strength calculations of machine elements such as tension, cogged, friction gears, bearings, rolling and sliding gears, couplings, brakes - [M1_U15]</p> <p>3. He can prepare technical documentation descriptively - drawing engineering tasks - [M1_U19]</p>
<p><b>Social competencies:</b></p>
<p>1. Is ready to critically evaluate your knowledge and content you receive - [M1_K01]</p> <p>2. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem - [M1_K02]</p>

<b>Assessment methods of study outcomes</b>
<p>Forming assessment:</p> <p>a) in a scope of the exercise classes: assessment of the answers for the questions concerning the knowledge which was presented during previous classes</p> <p>a) in a scope of lectures: assessment of the answers for the questions concerning the knowledge which was presented during previous lectures</p> <p>Summarizing assessment:</p> <p>a) in a scope of the exercise classes: written exam.</p> <p>b) in a scope of lectures: written exam</p>

<b>Course description</b>
<p>The structure of the machine drive system, the functions of transmission, clutch, the basic parameters of the drive, drive types, kinematic diagrams. Split couplings, design review and applications. Starting layout drive with clutch. Clutch: fixed, controlled, sensitive, overload. Calculation of couplings and the rules for the selection. The general division of drives, design review, the basic parameters. Rules for selection of gear ratios and the calculation of torques. Gears: classification, the outline of the teeth. Helical gear: geometry, kinematics. wheels, interdenal force, the base of the structure. Bevel gear, the geometric parameters of the wheels, interdenal force. State of stress in the gear wheel teeth. Design calculations of spur gear. Worm gears, geometry, kinematics. Planetary Gear, examples of construction. General characteristics of belt drives, power and tension in the belt cords, power and gear efficiency. The calculation and selection of the design characteristics of belt drives. Chain drives. Power screw assemblies.</p>

<p><b>Basic bibliography:</b></p> <p>1. J. Żółtowski, Podstawy Konstrukcji Maszyn, Oficyna Wydawnicza Politechniki Warszawskiej, 2002.</p> <p>2. R. Knosala, A. Gwiazda, A. Baier, P. Gendarz, Podstawy Konstrukcji Maszyn, WNT, Warszawa 2000.</p> <p>3. A. Dziurski, L. Kania, A. Kasprzycki, E. Mazanek, Przykłady obliczeń z Podstawy Konstrukcji Maszyn, Tom 1 i 2, WNT, Warszawa 2005.</p>
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<p><b>Additional bibliography:</b></p> <p>1. Dietrich M.; Podstawy konstrukcji maszyn, Wydawnictwo Naukowo - Techniczne 1995.</p> <p>2. Niezgodziński M. E., Niezgodziński T.; Wzory, wykresy i tablice wytrzymałościowe, Wydawnictwo Naukowo ? Techniczne, 1996,</p> <p>3. Sempruch J., Piątkowski T.; Podstawy konstrukcji maszyn z CAD, Piła, Państwowa Wyższa Szkoła zawodowa w Pile, 2006</p>
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<b>Result of average student's workload</b>	
<b>Activity</b>	<b>Time (working hours)</b>
1. Lectures	30
2. Consultations	2
3. Preparation to pass the exam	10
4. Participation in the exam	2
5. Participation in the exercise classes	15
6. Preparation to the exercise classes	8
7. Preparation to pass the exercise classes	10
8. Participation in the exercise classes exam	2
9. Participation in the project activities	30
10. Preparation of the project	25
11. Consultation project	5
12. Preparation to pass the project exercises	15
13. Participation in project passing	2

<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	158	6
Contact hours	90	4
Practical activities	77	3