

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Machining		Code 1010601131010200397
Field of study Mechanical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 1 Classes: 1 Laboratory: - Project/seminars: -		No. of credits 2
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 2 100% 2 100%
Responsible for subject / lecturer: dr inż. Marek Rybicki email: marek.rybicki@put.poznan.pl tel. 616652723 Wydział Budowy Maszyn i Zarządzania ul. Piotrowo 3, 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	The student has a basic knowledge of physics, mathematics and mechanics.
2	Skills	Student is able to use the acquired knowledge to the analysis of specific manufacturing techniques and know how to use the information obtained from the library and the Internet.
3	Social competencies	The student demonstrates self-reliance in solving problems, acquire and improve their knowledge and skills, understanding the need for learning.
Assumptions and objectives of the course: Getting to know the future engineers of kinematics, technological capabilities, machine tools and tools at different cutting methods. Knowing how to calculate the roughness of the theoretical parameters and cutting power. Acquisition of skills selection of material and geometry of the blade, the cutting parameters and the length of the road run-in and run a variety of tools.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Able to characterize different ways of cutting (kinematics, technological capabilities, machines and tools) - [K1A_W04 K1A_W15] 2. Has knowledge of the types of tool materials and methods for their preparation - [K1A_W09 K1A_W10]		
Skills:		
1. He can choose the ways of cutting tools, road and runway overrun tools and materials to complete the part. - [K1A_U03 K1A_U18] 2. Able to distinguish and find a variety of tools, methods of cutting and machine tools. - [K1A_U15] 3. Can communicate using the basic concepts and the size of the field of machining contained in books, magazines, catalogs utilities, materials, machine tool companies - [K1A_U01] 4. It can calculate the length of road and runway overrun, that there is no collision during machining. It can calculate with which cutting parameters can process not to exceed the power machine, machined surface roughness, tool life for different ways to cut. - [K1A_U07]		
Social competencies:		
1. Able to resolve dilemmas in the field of machining in the plane of the modern economy and society - [K1A_K05]		

Assessment methods of study outcomes	
<p>Lecture: Assessment based on a test performed on the last class in the semester (in the case of response to 50 to 60% of the questions - dst, over 60 to 70% - dst +, above 70 to 80% - db, above 80 to 90% - db +, greater than 90 to 100% - very good)</p> <p>Exercise: Assessment based on two quizzes conducted in the middle and at the end of the semester. To get the number of absences exercise credit may not exceed one third of classes. In case of dissolution of 50 to 60% of the tasks - dst, over 60 to 70% - dst +, greater than 70 to 80% - db, over 80 to 90% - db +, greater than 90 to 100% - very good)</p>	
Course description	
<p>Lecture</p> <ol style="list-style-type: none"> 1) Classification of manufacturing technologies. 2) Conditions for cutting existence (material decohesion). 3) Kinematics, technological possibilities, machine and cutting tools for various machining methods: <ol style="list-style-type: none"> a. with defined cutting tools geometry (turning, milling, turn-milling, drilling operations, broaching, slotting) b. with undefined cutting tools geometry (grinding, ultrasonic assisted grinding, superfinishing, lapping). 4) Technological and geometrical cutting parameters and bases of their selection. 5) Elementary knowledge of tools geometry materials. Wedge wear and tool life. 6) Accuracy as well as theoretical and real roughness of machined surface. 7) Forces, torque and power of cutting. 8) Machinability of various materials. <p>Classes</p> <ol style="list-style-type: none"> 1) Kinematics of machining: <ol style="list-style-type: none"> a. cutting speed, feedrate, feed per revolution and per tooth, effective speed. b. enter and exit length of tools as well as machining time. 2) Geometrical and technological elements of cut area for various machining methods: <ol style="list-style-type: none"> a. width and thickness of cut, depth of cut, b. area of cut per one wedge and total area of cut variability. 3) Kinematic-geometrical mapping of wedge in work material. Theoretical surface roughness. 4) Forces, torque and power for various methods and types of machining. 5) Tool life and periodical cutting speed. 	
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Dul-Korzyńska B.: - Obróbka skrawaniem i narzędzia. Oficyna Wydawnicza Politechniki Rzeszowskiej 2009. 2. Erbel J. (red.): Encyklopedia technik wytwarzania w przemyśle maszynowym. Tom II. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001. 3. Filipowski R., Marciniak.: Techniki obróbki mechanicznej i erozyjnej. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2000. 4. Kawalec M.: Ćwiczenia z podstaw skrawania. Skrypt 1138, Wydawnictwo Politechniki Poznańskiej 1983. 5. Kosmol J. (red.): Techniki wytwarzania ? obróbka wiórowa i ścierna. Wydawnictwo Politechniki Śląskiej, Gliwice 2002. 6. Olszak W.: Obróbka skrawaniem. WNT Warszawa 2008. 7. Żebrowski H. : Techniki wytwarzania. Obróbka wiórowa, ścierna i erozyjna. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2004. 	
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Cichosz P.: Narzędzia skrawające. WNT. Warszawa 2008. 2. Czasopisma naukowo-techniczne: Mechanik, Przegląd Mechaniczny, Werkstatt und Betrieb 3. Materiały firm narzędziowych (ZOS IMt PP Internet page) 4. Schneider G.: Cutting tool applications. ASM International 2002 5. Shaw M.C.: Metal Cutting Principles. Oxford University Press, Oxford 1996. 	
Result of average student's workload	
Activity	Time (working hours)
1. Preparation for lectures	2
2. Participation in the lecture	28
3. Fixation of the lecture	5
4. Consultation	1
5. Exam Preparation	12
6. Participation in the exam	2
Student's workload	

Source of workload	hours	ECTS
Total workload	50	2
Contact hours	31	0
Practical activities	0	0