



COURSE SPECIFICATION

Course code	M#1-S1-ME-KWW-506
Course title in Polish	Obróbka skrawaniem
Course title in English	Machining
Valid from (academic year)	2019/2020

GENERAL INFORMATION

Programme of study	MECHANICAL ENGINEERING
Level of qualification	first-cycle
Type of education	academic
Mode of study	full-time
Specialism	Computer-Aided Manufacturing
Department responsible	Department of Manufacturing Engineering and Metrology
Course leader	Prof. Edward Miko, BEng, PhD
Approved by	

COURSE OVERVIEW

Course type	specialism-related
Course status	compulsory
Language of instruction	English
Semester of delivery	semester 5
Pre-requisites	Fundamentals of Machining
Examination required (YES/NO)	YES
ECTS value	5

Mode of instruction	lecture	class	laboratory	project	seminar
No. of hours per semester	30		30		

LEARNING OUTCOMES

Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	They will have knowledge of nomenclature, construction, principles of operation of various types of machines, determining the basic parameters of their work. The student knows and understands the physical phenomena occurring in the cutting process. Has knowledge of the classification of subtractive processes.	MiBM_W08
	W02	They will have a fundamental knowledge of the techniques of manufacturing machine parts, including machining techniques, and has a basic knowledge of the construction of machines for processing and shaping materials. The student knows the course of the machining allowance removal mechanisms. He knows how to properly choose the processing conditions	MiBM_W10
	W03	They will have knowledge related to selected issues in the field of manufacturing basic elements of machines and devices.	MiBM1_W15
Skills	U01	They will be able to analyze and draw conclusions on the influence of selected machining factors on the material removal process.	MiBM1_U04
	U02	They will be able to design a simple technological process of mechanics. The student is able to select machining parameters and tools for a specific technological task.	MiBM1_U08
Competence	K01	On completion of this programme students will understand the need for and know the opportunities of gaining further professional qualifications (second cycle programmes, third cycle programmes, postgraduate non-degree courses, training courses) to enhance their professional, personal and social development.	MiBM1_K01
	K02	They will be aware of and understand the relationships between engineering and non-engineering activities, including their impact on the environment and the responsibility for decision-making.	MiBM1_K02

COURSE CONTENT

Type of instruction*	Topics covered
lecture	Classification of machining processes. The use of machining in modern production processes. Geometric and material characteristics of the cutting edge. Physical aspects of the cutting process. Mechanics of the cutting process. Forces in the cutting process. Energy and cutting power. Chip curling and breaking. Vibrations in the cutting process. Heat in the cutting process. Methods of determining the temperature in the cutting zone. The role and tasks of cooling lubricants. Blade wear and durability. Machinability of construction materials. Machining technology: turning, drilling, reaming and boring, cylindrical and face milling. Threading methods. Outline of chip methods of gear teeth processing. Basics of abrasive processing. Properties and consumption of abrasive materials and tools. Grinding, honing, oscillating superfinishing, lapping and polishing.
laboratory	1. Health and safety training, rules for passing the course, exercise schedule.
	2. Influence of cutting technological parameters on roughness of turned surfaces
	3. Cutting temperatures during turning
	4. Cutting force and torque in the drilling process
	5. Drilling, reaming and boring holes
	6. Threading and forming internal threads

	7. The influence of technological parameters of cutting on the roughness of milled surfaces
	8. Errors of cutting inserts in the body of a multi-edge tool and their impact on the cutting process
	9. Examination of wear and blade life
	10. Forces in the milling process
	11. Cutting temperatures in milling
	12. Vibrations in the milling process
	13. Geometric structure of the surface after grinding
	14. Thermal drilling
	15. Test

*) Please delete rows in the table above that are not applicable.

ASSESSMENT METHODS

Outcome code	Methods of assessment <i>(Mark with an X where applicable)</i>					
	Oral examination	Written examination	Test	Project	Report	Other
W01		X				
W02		X				
W03		X				
U01			X		X	
U02			X		X	
K01						X
K02						X

ASSESSMENT TYPE AND CRITERIA

Mode of instruction*	Assessment type	Assessment criteria
lecture	examination assessment	The pass mark is a minimum of 50 points out of a possible 100 for the examination.
laboratory	non-examination assessment	Regular class attendance. A pass mark for each post-lab report. A minimum of 50 points out of a possible 100 for the final in-class test.

*) Please delete rows in the table above that are not applicable.

OVERALL STUDENT WORKLOAD

ECTS weighting							
	Activity type	Student workload					Unit
		L	C	Lab	P	S	
1.	Scheduled contact hours	30		30			h
2.	Other contact hours (office hours, examination)	4		2			h
3.	Total number of contact hours	66					h
4.	Number of ECTS credits for contact hours	2,6					ECTS
5.	Number of independent study hours	59					h
6.	Number of ECTS credits for independent study hours	2,4					ECTS

7.	Number of practical hours	63	h
8.	Number of ECTS credits for practical hours	2,5	ECTS
9.	Total study time	50	h
10.	ECTS credits for the course <i>1 ECTS credit = 25-30 hours of study time</i>	5	ECTS

READING LIST

1. Advanced Machining Processes of Metallic Materials: Theory, Modelling, and Applications by Wit Grzesik
2. Modern Machining Technology: A Practical Guide (Woodhead Publishing in Mechanical Engineering) by J Paulo Davim
3. Fundamentals of Metal Machining and Machine Tools by Winston A. Knight, Geoffrey Boothroyd