



### COURSE SPECIFICATION

Course code	<b>M#1-S1-ME-KWW-507</b>
Course title in Polish	<b>Budowa obrabiarek i maszyn CNC</b>
Course title in English	<b>CNC Machine Tools: Design and Operation</b>
Valid from (academic year)	<b>2019/2020</b>

### GENERAL INFORMATION

Programme of study	<b>MECHANICAL ENGINEERING</b>
Level of qualification	<b>first-cycle</b>
Type of education	<b>academic</b>
Mode of study	<b>full-time</b>
Specialism	<b>Computer-Aided Manufacturing</b>
Department responsible	<b>Department of Manufacturing Engineering and Metrology</b>
Course leader	<b>Łukasz Nowakowski, BEng, PhD</b>
Approved by	

### COURSE OVERVIEW

Course type	<b>specialism-related</b>
Course status	<b>compulsory</b>
Language of instruction	English
Semester of delivery	<b>semester 5</b>
Pre-requisites	<b>Theory of Machines, Technical Drawing, Manufacturing Engineering</b>
Examination required (YES/NO)	NO
ECTS value	<b>3</b>

Mode of instruction	lecture	class	laboratory	project	seminar
No. of hours per semester	<b>30</b>		<b>15</b>		

## LEARNING OUTCOMES

Category of outcome	Outcome code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	They will have a fundamental knowledge of creating and analyzing technical documentation with elements of engineering design with the use of graphic and computational programs.	MiBM1_W12
	W02	They will have a detailed knowledge related to selected issues in the field of machine construction, production technology of basic elements of machines and devices, their operation, evaluation of operational properties and wear, diagnosis of the technical condition, repair technology and safe use.	MiBM1_W15
Skills	U01	They will be able to develop documentation on the implementation of an engineering task in the field of mechanics and machine construction, prepare a text containing a discussion of the results of this task.	MiBM1_U04
	U02	They will be able to use information and communication tools appropriate to the implementation of tasks typical for engineering activities in the field of mechanics and machine construction, including the ability to prepare and present a short presentation devoted to the results of an engineering task.	MiBM1_U05
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	As part of the lectures, the following program content will be provided, including: development trends of modern machine tools, basics and examples of modular construction and basic properties of machine tools, technical solutions and construction of the most important assemblies and components: bodies, connections guideways, main and feed movement drives, coding systems for pallets and tools. Characteristics of four basic groups of CNC machine tools will be presented: lathes and turning centres, milling machines and milling centres, grinders and machine tools implementing hybrid manufacturing technologies.

laboratory	<p>As part of the laboratory classes, 6 exercises will be performed to familiarize students with the construction and technological capabilities of selected machine tools. The scope of laboratory classes will include:</p> <ul style="list-style-type: none"> <li>• construction, equipment and technological possibilities of the CTX 310 ECO turning centre,</li> <li>• construction, equipment and technological possibilities of the CTX ALPHA 500 turning centre,</li> <li>• construction, equipment and technological possibilities of the AVIA VMC 800 milling centre,</li> <li>• construction, equipment and technological possibilities of the HERLME B 300 milling centre,</li> <li>• construction, equipment and technological capabilities of the DMU 50 milling centre with a PH150 pallet stacker,</li> <li>• construction, equipment and technological possibilities of the SACCKE UWIC tool grinder.</li> </ul>
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\*) 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			
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 final in-class test.
laboratory	non-examination assessment	Regular class attendance. The pass mark is a minimum of 50 points out of a possible 100 for each post-lab report and 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		15			h
2.	Other contact hours (office hours, examination)	2		2			h
3.	<b>Total number of contact hours</b>	<b>49</b>					h
4.	<b>Number of ECTS credits for contact hours</b>	<b>2,0</b>					ECTS
5.	<b>Number of independent study hours</b>	<b>26</b>					h

6.	<b>Number of ECTS credits for independent study hours</b>	<b>1</b>	ECTS
7.	<b>Number of practical hours</b>	<b>25</b>	h
8.	<b>Number of ECTS credits for practical hours</b>	<b>1</b>	ECTS
9.	<b>Total study time</b>	<b>75</b>	h
10.	<b>ECTS credits for the course</b> <i>1 ECTS credit = 25-30 hours of study time</i>	<b>3</b>	ECTS

### **READING LIST**

1. CNC Machining Handbook: Building, Programming, and Implementation Paperback by Alan Overby
2. Build Your Own CNC Machine by Patrick Hood-Daniel
3. CNC Handbook by Helmut A. Roschiwal, Hans B. Kief