



### COURSE SPECIFICATION

Course code	<b>M#1-S1-ME-KWW-605</b>
Course title in Polish	<b>Metrologia Produkcyjna</b>
Course title in English	<b>Metrology for Manufacturing</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>Dr hab. inż. Krzysztof Stępień, prof. PŚk</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 6</b>
Pre-requisites	<b>Metrology I, Metrology II</b>
Examination required (YES/NO)	NO
ECTS value	<b>2</b>

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

## LEARNING OUTCOMES

Category of outcome	Out-come code	Course learning outcomes	Corresponding programme outcome code
Knowledge	W01	On completion of the course students will have a knowledge of principles of operation on toleranced dimensions. Students will know how to apply these principles to calculate measurement dimensions.	MiBM1_W01 MiBM1_W16
	W02	On completion of the course students will have knowledge of methods of calculations applied in dimensional analysis, including optimization methods.	MiBM1_W01 MiBM1_W16
Skills	U01	On completion of the course, students will be able to conduct mathematical operations on toleranced dimensions. Students will have skills to calculate missing chains in simple and complex dimensional chains.	MiBM1_U01
	U02	On completion of the course students will have skills to calculate components of dimensional chains for total and partial interchangeability. Students will be able to apply various methods for this purpose, including optimization methods.	MiBM1_U12
Competence	K01	On completion of the course students will be aware of the importance of team work and correct coordination of the work of team members.	MiBM1_K04

## COURSE CONTENT

Type of instruction*	Topics covered
lecture	Principles of the mathematical operations on toleranced dimensions. Classification of dimensional chains. Principles of the calculation of missing links in dimensional chains. Total and partial interchangeability of machine parts. Equal tolerance method. Equal tolerance grade method. Equal influence method. The method of minimum cost.
class	1. Mathematical operations on toleranced dimensions. 2. Calculation of missing links in various types of dimensional chains. 3. Calculation of tolerances of chain links for the case of total and partial interchangeability of machine parts.

\*) 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			
U02			X			
K01						X

## ASSESSMENT TYPE AND CRITERIA

Mode of instruction*	Assessment type	Assessment criteria
lecture	<b>non-examination assessment</b>	<i>The pass mark is a minimum of 50% for the final test.</i>
class	non-examination assessment	<i>Regular class attendance. The pass mark is a minimum of 100 points for two in-class-tests.</i>

\*) 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	15	15				h
2.	Other contact hours (office hours, examination)	2	2				h
3.	<b>Total number of contact hours</b>	34					h
4.	<b>Number of ECTS credits for contact hours</b>	1,4					ECTS
5.	<b>Number of independent study hours</b>	16					h
6.	<b>Number of ECTS credits for independent study hours</b>	0,6					ECTS
7.	<b>Number of practical hours</b>	32					h
8.	<b>Number of ECTS credits for practical hours</b>	1,3					ECTS
9.	<b>Total study time</b>	50					h
10.	<b>ECTS credits for the course</b> <i>1 ECTS credit = 25-30 hours of study time</i>	<b>2</b>					ECTS

## READING LIST

1. Praca zbiorowa pod redakcją Z. Humiennego „Geometrical Product Specifications - Course for Technical Universities” – Oficyna Wydawnicza Politechniki Warszawskiej, 2001.
2. Connie L. Dotson, Fundamentals of dimensional metrology, Cengage Learning, 2016.
3. D. J. Whitehouse: Handbook of Surface and Nanometrology, CRC Press, 20 gru 2010
4. S. Adamczak, W. Makiela, Metrologia w budowie maszyn – zadania z rozwiązaniami, PWN, 2018, Warszawa,