COURSE SPECIFICATION

Course code	full-time programme:	**M#2-S1-ME-309**
	part-time programme:	
Course title in Polish	**Podstawy metrologii**	
Course title in English	**Fundamentals of Metrology**	
Valid from (academic year)	**2024/2025**	

GENERAL INFORMATION

Programme of study	**MECHANICAL ENGINEERING**
Level of qualification	**first-cycle**
Type of education	**academic**
Mode of study	**full-time programme**
Specialism	**all**
Department responsible	**Department of Metrology and Modern Manufacturing**
Course leader	**dr hab. inż. Krzysztof Stępień, prof. PŚk** **dr hab. inż. Paweł Zmarzły, prof. PŚk**
Approved by	**dr hab. Jakub Takosoglu, prof. PŚk, Dean of the Faculty of Mechatronics and Mechanical Engineering**

COURSE OVERVIEW

Course type		**programme-specific**
Course status		**compulsory**
Language of instruction		**English**
Semester of delivery	full-time programme	**Semester III**
	part-time programme	
Pre-requisites		
Examination required (YES/NO)		**NO**
ECTS value		**1**

Mode of instruction		lecture	class	laboratory	project	seminar
No. of hours per semester	full-time programme			**15**		
	part-time programme					

LEARNING OUTCOMES

Category of outcome	**Outcome code**	**Course learning outcomes**	**Corresponding programme outcome code**

Skills	U01	Students can perform measurements of basic geometric quantities. They can use basic instruments for measuring geometric quantities. They can select an instrument for a specific measurement task.	MiBM1_U01 MiBM1_U12
	U02	Students can use knowledge from the field of fundamental sciences to analyze measurement uncertainty in direct and indirect measurements.	MiBM1_U01 MiBM1_U12
Competence	K01	Students are ready to critically evaluate his knowledge in the field of metrology and measurement technique used in mechanical engineering and the need to obtain new information from both literature and experts.	MiBM1_K01

COURSE CONTENT

Type of instruction lecture	Topics covered
laboratory	Construction and principle of operation of workshop and laboratory measuring tools. Measurements of selected geometric features using workshop measuring tools. Analysis of measurement uncertainty in direct measurements. Analysis of measurement uncertainty in indirect measurements. Measurements of gauges. Study of the metrological properties of measuring tools. The use of computer-aided instruments in the metrology of geometric quantities.

ASSESSMENT METHODS

Outcome code	Methods of assessment *(Mark with an X where applicable)*					
	Oral examination	Written examination	Test	Project	Report	Other
U01			X		X	
U02			X		X	
K01						X

ASSESSMENT TYPE AND CRITERIA

Mode of instruction	Assessment type	Assessment criteria
laboratory	non-examination assessment	Positive completion of laboratory reports. Obtaining at least 50% of points in the final test.

OVERALL STUDENT WORKLOAD

ECTS weighting												
No.	Activity type	Student workload										Unit
		full-time programme					part-time programme					
		L	C	Lb	P	S	L	C	Lb	P	S	
1.	Scheduled contact hours			15								h
2.	Other contact hours (office hours, examination)			2								h

3.	**Total number of contact hours**	**17**		h
4.	**Number of ECTS credits for contact hours**	**0,7**		ECTS
5.	**Number of independent study hours**	**8**		h
6.	**Number of ECTS credits for independent study hours**	**0,3**		ECTS
7.	**Number of practical hours**	**25**		h
8.	**Number of ECTS credits for practical hours**	**1,0**		ECTS
9.	**Total study time**	**25**		h
10.	**ECTS credits for the course** *1 ECTS credit = 25-30 hours of study time*	**1**		ECTS

READING LIST

1. Adamczak S., Metrologia geometryczna powierzchni technologicznych, Wydawnictwo Naukowe PWN, Warszawa, 2023.
2. Adamczak S., „Pomiary geometryczne powierzchni", WNT, 2009.
3. Adamczak S., Makieła W., Podstawy metrologii i inżynierii jakości dla mechaników – ćwiczenia praktyczne, PWN, Warszawa, 2010.
4. Arendarski J., Niepewność pomiarów, Oficyna Wydawnicza Politechniki Warszawskiej, 2013.
5. Ciepłucha J. Podstawy metrologii, Wydawnictwo Politechniki Łódzkiej, 2008.
6. Paczyński P. „Metrologia Techniczna. Przewodnik do wykładów, ćwiczeń i laboratoriów", Politechnika Poznańska, 2003.
7. Barzykowski, J., A. Domańska, M. Kujawińska, Współczesna metrologia – wybrane zagadnienia, WNT, Warszawa, 2016
8. Jakubiec W., Malinowski J., Metrologia Wielkości Geometrycznych, WNT, Warszawa, 2007.
9. Tumański S.: Technika pomiarowa. WNT, Warszawa, 2007
10. Zator S., Majda P., Jakubiec W., Metrologia, PWE Polskie Wydawnictwo Ekonomiczne, 2014.
11. Praca zbiorowa pod redakcją Z. Humiennego „Geometrical Product Specifications - Course for Technical Universities" – Oficyna Wydawnicza Politechniki Warszawskiej, 2001.
12. Katalog przyrządów pomiarowych 2019-2021 Mitutoyo - PL-20004.