DOCTORAL SCHOOL OF WROCŁAW UNIVERSITY OF SCIENCE AND TECHNOLOGY

SUPERVISOR DECLARING/CONDUCTING COURSE: Artur Andruszkiewicz, PhD, DSc
DEPARTMENT: Faculty of Mechanical and Power Engineering
SCIENTIFIC DISCIPLINE: Environmental Engineering, Mining and Energy

COURSE CARD

Course name in Polish: Analiza błędów w procesach pomiarowych
Course name in English: Error analysis in measurement process
Course language: polish / ~~english~~

The course is intended for all PhD students: YES / ~~NO~~
1) ~~BASIC COURSE~~
2) SPECIALIST COURSE
3) ~~SEMINAR~~
4) ~~HUMANISTIC COURSE~~
5~~) LANGUAGE~~
6~~) RESEARCH SKILLS~~

Subject code: IGQ100229W

* delete as applicable

	Lecture	Foreign language course	Seminar	Mixed forms
Number of hours of organized classes in university (ZZU)	15			
Grading	Exam	Exam	Oral presentation	Exam, inspection, evaluation classes

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. General knowledge of mathematics and physics.

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COURSE OBJECTIVES

C1 - acquainting doctoral students with basic concepts in error analysis
C2 - acquiring of the ability to determine different types of uncertainty
C3 - acquiring the ability to use correlation and regression functions in the preparation of measurement characteristics

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PROGRAM CONTENTS

Form of classes		Number of hours
Lec1	Organizational matters. Discussing the content of the lecture and the rules of examination. Providing literature.	1
Lec2 Lec3 Lec4	Measurement error. The difference between error and uncertainty. Random, systematic, excessive errors. The concept of correction. Types of uncertainty. Gaussian and Student distributions. Examples.	6
Lec5	Increase accuracy of direct and indirect measurements.	2
Lec6 Lec7 Lec8	Correlation and regression methods, simple linear regression, weighted linear regression, weighted linear regression including the uncertainty of both variables. Examples.	6
	Total hours	15

TEACHING TOOLS USED

N1. Traditional lecture
N2. Office hours
N3. Individual work and preparation for the exam

ACHIEVED SUBJECT LEARNING OUTCOMES

Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8S_WG	- has advanced knowledge in the area of major subjects that belong to a given discipline or interdisciplinary subjects
Skills	P8S_UW	- has scientific and technological skills related to the methods and methodology of scientific research and the critical evaluation of obtained results - can creatively interpret the obtained results and actively seek their application

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] *Wyrażanie niepewności pomiaru.* Przewodnik. Główny Urząd Miar
[2] J. arendarski: *Niepewność pomiaru.* Oficyna Wydawnicza politechniki Warszawskiej, Warszawa 2003
[3] D. Turzeniecka: *Ocena niepewności pomiarów. Wydawnictwo politechniki Poznańskiej, Poznań 1997*
[4] W. Jakubiec, S. Zator, P. Majda: *Metodologia.* Polskie Wydawnictwo Ekonomiczne. Warszawa 2014

SECONDARY LITERATURE:

[1] J. R. Taylor: *Wstęp do analizy błędu pomiarowego.* PWN 1989

[2] A. Chwaleba, M. Poniński, A. Siedlecki: *Metrologia elektryczna.* WNT. Warszawa 2000

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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