COURSE OFFERED IN THE DOCTORAL SCHOOL

Code of the course		4606-EW-0000	200 0005	New		Polish	Metodologia prowadzenia badań naukowych		
		4606-EW-00000	00-0085 N	ivar	Name of the course	English		Methodological aspects of technoscientific research	
Type of the course		Researcher's Workshop							
Course coordinator		prof. dr. hab. Roman Z. Morawski							
Implementing unit				Scie	ntific discipline / disciplines*				
Level of education		Doctoral Program			Semester	winter			
Language of the course		english							
Type of assessment:		Credit with grade		N	umber of hours in a semester	20+36=56		ECTS credits	2
Minimum number of participants		15		N	Maximum number of participants	er 120		Available for studen (BSc, MSc)	ts Yes
Type of classe			Lecture		Auditory classe	Project	classes	Laboratory	Seminar
		in a week	-						
Number of hours	in	a semester	10		10 (tutorials & test	s)			

^{*} does not apply to the Researcher's Workshop

1. Prerequisites

No prerequisites.

2. Course objectives

The course is aimed at the development of intellectual skills necessary for consideration of methodological issues related to research practice, especially the skills necessary for resolving methodological dilemmas related to research activities and interdisciplinary communication, as well as at providing basic information concerning the philosophy of science and research methodology.

3. Course content (separate for each type of classes)

Lecture

- **Basic concepts of philosophy of science:** science and philosophy of science, logical and epistemological background, research methodology.
- **Mathematical modelling and measurement:** philosophical background of mathematical modelling, key concepts of mathematical modelling, identification of a mathematical model, meta-model of measurement, concepts of metrology *vs.* concepts of mathematical modelling.
- **Scientific method:** scientific method in historical perspective, crisis of truth and the spirit of relativism, naïve understanding of scientific method and its critical interpretation, scientific truth *vs.* cognitive status of mathematical modelling and measurement.
- **Research process:** choice of a research problem and research methodology, design and execution of experiments, acquisition and processing of experimental data.
- **Dissemination of research findings**: overview of dissemination methods, publication and vulgarisation of technoscientific knowledge

Laboratory

- Class tutorials have the form of discussions, animated by the Ph.D. students, devoted to the following topics: modern approaches of research methodology (Class Tutorial #1), methodological issues related to scientific justification (Class Tutorial #2), and methodological issues related to data processing and publication (Class Tutorial #3).
- Class Test #1 (and its make-up option Test #1') is covering the material of the first parts of the lecture, viz.

 Basic concepts of philosophy of science and Mathematical modelling and measurement; Class Test #2 (and its make-up option Test #2') is covering the material of the last parts of the lecture, viz. Scientific method,

 Research process and Dissemination of research findings.

4. Learni	4. Learning outcomes						
	Learning outcomes description	Reference to the learning outcomes of the WUT DS	Learning outcomes verification methods*				
	Knowledge						
K01	A Ph.D. student, who passed the course, is expected to have elementary knowledge concerning basic concepts of philosophy of science, mathematical modelling and measurement.	SD_W3 SD_W4 SD_W5	Class Tests #1 & #1'				
K02	A Ph.D. student, who passed the course, is expected to have elementary knowledge concerning the scientific method, the research process and the dissemination of research findings.	SD_W3 SD_W4 SD_W5	Class Tests #2 & #2'				
	Skills						
S01	A Ph.D. student, who passed the course, is expected to be able to identify and critically analyse methodological issues related to research activities, as well as to discuss methodological issues related to research practice.	SD_U1 SD_U2 SD_U5 SD_U6 SD_U7	Class Tests #2 & #2' [active participation during classes] Class Tutorials #1 – #3				
	Social competences						
SC01	A Ph.D. student, who passed the course, is expected to be more sensitive to pragmatic values related to scientific research, better prepared for resolving dilemmas that appear in research practice, and better prepared for interdisciplinary communication.	SD_K2 SD_K5	[active participation during classes] Class Tutorials #1 – #3				

^{*}Allowed learning outcomes verification methods: exam; oral exam; written test; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests

5. Assessment criteria	3
Partial grading:	
Class Test #1	up to 35 pts
Class Test #2	up to 45 pts
Class Tutorials	up to 20 pts (for animation of class discussion)
Final grading:	
0 ≤∑pts < 50	→ 2
50 ≤∑pts < 60	→ 3
60 ≤∑pts < 70	→ 3.5
70 ≤∑pts < 80	→ 4
80 ≤∑pts < 90	→ 4.5
90 ≤∑pts ≤100	→ 5

6. Literature

Literatura podstawowa:

- [1] Lecture notes updated for each realisation of the course.
- [2] R. Z. Morawski, *Technoscientific Research: Methodological and Ethical Aspects*, Walter de Gruyter, Berlin Boston 2019, Chapters 1–10.

Literatura uzupełniająca:

Documents in the PDF and MP3 formats, fit to the needs of class tutorials, specific for each realisation of the course

Warsaw University of Technology

7. PhD	7. PhD student's workload necessary to achieve the learning outcomes**			
No.	Description	Number of hours		
1	Hours of scheduled instruction given by the academic teacher in the classroom	20		
2	Hours of consultations with the academic teacher, exams, tests, etc.			
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	20		
4	Amount of time devoted to the preparation for exams, test, assessments	16		
	Total number of hours	56		
	ECTS credits	2		

^{** 1} ECTS = 25-30 hours of the PhD students work (2 ECTS = 60 hours; 4 ECTS = 110 hours, etc.)