COURSE OFFERED IN THE DOCTORAL SCHOOL

Code of the course	4606-EW-0000000-0085	Name of the course	Polish	Metodologia prowadzenia badań naukowych
			English	Methodological aspects of technoscientific research

Type of the course	Researcher's Workshop			
Course coordinator	prof. dr. hab. Roman Z. Morawski			
Implementing unit		Scientific discipline / disciplines*		
Level of education	Doctoral Program	Semester	winter	
Language of the course	english			

Type of assessment:	Credit with grade	Number of hours in a semester	20+36=56	ECTS credits	2
Minimum number of participants	15	Maximum number of participants	120	Available for students (BSc, MSc)	Yes

Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week					
	in a semester	10	10 (tutorials & tests)			

* 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, v*iz. 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, v*iz. Scientific method, Research process* and *Dissemination of research findings.*

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

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:

    $0 \leq \sum pts < 50$ → 2
   $50 \leq \sum pts < 60$ → 3
   $60 \leq \sum pts < 70$ → 3.5
   $70 \leq \sum pts < 80$ → 4
   $80 \leq \sum pts < 90$ → 4.5
   $90 \leq \sum pts \leq 100$ → 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

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.)