Warsaw University of Technology

COURSE OFFERED IN THE DOCTORAL SCHOOL

Code of the course	4606-EW-0000000-0174	Name of the course	Polish	**Jak Rozpoznać i Obalić Pseudonaukę**
			English	**How to Recognize and Debunk Pseudoscience**
Type of the course	Researcher's workshop (*warsztat badacza*)			
Course coordinator	Dr. Antonio Vassallo	Course teacher	Dr. Antonio Vassallo	
Implementing unit	WAiNS PW	Scientific discipline / disciplines*		

Level of education	Doctoral studies	Semester	spring		
Language of the course	English				
Type of assessment	Grading	Number of hours in a semester	30	ECTS credits	2
Minimum number of participants	12	Maximum number of participants	-	Available for students (BSc, MSc)	Yes/~~No~~

Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week	2				
	in a semester	30				

* does not apply to the Researcher's Workshop

1. Prerequisites

No Prerequisites.

2. Course objectives

The workshop's objective is threefold. First, it will familiarize the students with the debate "pseudoscience vs. real science" and the nuances involved in distinguishing the two camps. Second, it will present an analysis, based on concrete case studies, of the logical fallacies and the faulty experimental methodology characterizing dubious scientific claims. Third, it will develop the students' critical thinking skills needed to recognize pseudoscientific claims and expose their faulty nature.

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

Lecture

During each class, the students will be presented with specific research topics and case studies, and will be invited to engage in group activities (e.g., debates, exercises) aimed at developing an understanding of the conceptual nuances involved in the discussion. In addition, the students will receive homework assignments in the form of questionnaires and readings to be discussed during the classes.

The list of research questions explored include:

- Why should we care about debunking pseudoscience?
- What is the difference, if any, between science and pseudoscience?
- How to evaluate the logical and empirical support of a claim?
- What is the role of explanation in assessing whether a claim is scientific or not?
- In what ways does the media promote the public misunderstanding of science?
- Why are superstitions so widespread even nowadays?

The list of case studies presented include:

- Astrology.
- Alternative medicines.

• Paranormal claims. • Antivax movements. • Conspiracy theories. • Cryptozoology. • Perpetual motion machines.
Laboratory

4. Learning outcomes			
Type of learning outcomes	Learning outcomes description	Reference to the learning outcomes of the WUT DS	Learning outcomes verification methods*
Knowledge			
K01	The students will know and understand the basic conceptual and methodological aspects that characterize genuine scientific enquiries, in contrast to pseudoscientific enterprises.	SD_W1	Active participation during classes and homework.
K02	The students will know and understand the most common deception practices involved in promoting pseudoscience.	SD_W3	Active participation during classes and homework.
K03	The students will know and understand the dangers of considering superstitious thinking and pseudoscientific practices on par with science in policy-making.	SD_W4	Active participation during classes and homework.
Skills			
S01	The students will be able to identify pseudoscientific claims and debunk them in a clear and simple manner.	SD_U2	Active participation during classes and homework.
S02	The students will be able to engage in a debate with pseudoscience proponents, exposing their faulty reasoning with strong and appropriate rational arguments.	SD_U5	Active participation during classes and homework.
Social competences			
SC01	The students will be ready to avoid the pitfalls of faulty, biased, or superstitious reasoning when conducting their own scientific research.	SD_K5	Active participation during classes and homework.

*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
50% Active participation during classes. 50% Homework.

6. Literature
Primary references:

[1] A.B. Kaufman, J.C. Kaufman (editors) – Pseudoscience: The Conspiracy against Science. MIT Press, 2018.

[2] J.C. Smith – Pseudoscience and Extraordinary Claims of the Paranormal: A Critical Thinker's Toolkit. Wiley-Blackwell, 2010.

[3] S.O. Hansson - "Science and Pseudo-Science", *The Stanford Encyclopedia of Philosophy* (Fall 2021 Edition, link).

Secondary references:

[1] B. Farha (editor) – Pseudoscience and Deception. University Press of America, 2014.

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	30
2	Hours of consultations with the academic teacher, exams, tests, etc.	5
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	25
4	Amount of time devoted to the preparation for exams, test, assessments	
	Total number of hours	**60**
	ECTS credits	**2**

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

8. Additional information	
Number of ECTS credits for classes requiring direct participation of academic teachers	1
Number of ECTS credits earned by a student in a practical course	1