**COURSE OFFERED IN THE DOCTORAL SCHOOL**

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| Code of the course | | 4606-ES-0000000-0285 | | | Name of the course | | | | Polish | | | | **Filozofia a nauka i technika** | | | | |  |
| English | | | | **Philosophy, science, and technology** | | | | |  |
| Type of the course | | Specialized courses | | | | | | | | | | | | | | | |  |
| Course coordinator | | Dr hab. Zbigniew Król | | | | | | Course teacher | | | | Dr Antonio Vassallo | | | | | |  |
| Implementing unit | | WAiNS | | | Scientific discipline / disciplines\* | | | | All | | | | | | | | |  |
| Level of education | | | Doctoral studies | | | Semester | | | | Winter | | | | | | | | |
| Language of the course | | | English | | | | | | | | | | | | | | | |
| Type of assessment | | | Grading | | | Number of hours in a semester | | | | 30h | | | | ECTS credits | | | 2 | |
| Minimum number  of participants | | | 12 | | | Maximum number of participants | | | | 40 | | | | Available for students  (BSc, MSc) | | | Yes | |
| Type of classes | | | | Lecture | | | Auditory classes | | | | Project classes | | | | Laboratory | Seminar | | |
| Number of hours | in a week | | | 2h | | | 2h | | | |  | | | |  |  | | |
| in a semester | | | 15h | | | 15h | | | |  | | | |  |  | | |

\* does not apply to the Researcher’s Workshop

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| 1. Prerequisites | | | | |
| General knowledge in mathematics, physics, astronomy, computer science, formal logic. | | | | |
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| 1. Course objectives | | | | |
| The course main objectives are:  (a) to highlight the natural openness of science and technology to philosophical issues and to clarify the (often hidden) role of philosophy in the development of sciences;  (b) to introduce the students to the most pressing philosophical questions concerning scientific knowledge and methodology;  (c) to build the analytical and critical skills needed to tackle these questions.  The discussion will in particular address the nature and justification of scientific reasoning, the relationship between laws of nature and explanation, and what it means for a scientific theory to be true. Some specific case studies from science and technology will be analyzed to illustrate and gain insight into these philosophical issues. | | | | |
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| 1. Course content (separate for each type of classes) | | | | |
| Lecture | | | | |
| 1) What is science?  ◦ The origins of modern science.  ◦ Why is the philosophy of science important?  ◦ Science and pseudoscience.  2) Scientific reasoning (1).  ◦ Deduction and induction.  ◦ Hume's problem.  3) Scientific reasoning (2).  ◦ Inference to the best explanation.  ◦ Probability and induction.  4) Explanation in science (1).  ◦ Deductive-nomological model.  ◦ The problem of symmetry.  ◦ The problem of irrelevancy.  5) Explanation in science (2).  ◦ Explanation and causality.  ◦ Can science explain everything?  ◦ Explanation and reduction.  6) Realism vs. anti-realism (1).  ◦ Taking a theory very seriously: Scientific realism.  ◦ The "no miracles" argument.  7) Realism vs. anti-realism (2).  ◦ The "observable/unobservable" distinction.  ◦ The non-determinism argument.  8) Scientific progress (1).  ◦ The logical positivist philosophy of science.  9) Scientific progress (2).  ◦ The structure of scientific revolutions.  ◦ Incommensurability and theory-ladenness of data.  10) Objections to science.  ◦ Scientism.  ◦ Science versus religion.  ◦ Is science free from values?  11) Case study 1: Philosophy of physics.  ◦ Are space and time real?  12) Case study 2: Philosophy of biology.  ◦ The problem of biological classification.  13) Case study 3: The philosophy of psychology.  ◦ Is the mind modular?  14) Case Study 4: Computational Philosophy.  ◦ Do we live in a simulation? | | | | |
| Auditory classes | | | | |
| In each class, the students will be presented with a precisely formulated research question centered around the philosophy of science and technology, and will be asked to engage in an open discussion where they will propose their different takes and solutions to the problem considered. | | | | |
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| 1. 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 doctoral student knows and understands the basic philosophical positions and methods in the context of modern scientific knowledge and technology, and recognizes the relationship of the development of science and technology to philosophy in a factual and historical context. | SD\_W1 | Class participation and final project. | |
| K02 | The doctoral student knows and understands the basic theories, positions and issues in the philosophy of science, philosophy of technology and philosophy of mathematics (including computer science). The student knows and understands the peculiarities and role of modern humanities for the development of science and technology. | SD\_W2 | Class participation and final project. | |
| K03 | The doctoral student knows and understands the role of ethics in scientific research and technology. | SD\_W4 | Class participation and final project. | |
| Skills | | | | |
| S01 | The doctoral student is able to see the relationship between fundamental problems of science and technology, and philosophy. The student is able to perceive philosophical problems in their discipline of knowledge. The student can use basic philosophical categories and terms in the context of problems of science and technology. | SD\_U2 | Class participation and final project. | |
| S02 | The doctoral student is able to present his scientific achievements in a broader philosophical and social context and is able to find and identify relevant elements in peer-reviewed works. | SD\_U4 | Class participation and final project. | |
| S03 | The doctoral student is able to present his research results not only to specialists in their field. | SD\_U5 | Class participation and final project. | |
| S04 | The doctoral student is able to understand the English terminology regarding the methodological and philosophical context of their discipline. | SD\_U6 | Class participation and final project. | |
| Social competences | | | | |
| SC01 | The doctoral student recognizes the importance of knowledge in solving cognitive and practical problems. | SD\_K2 | Class participation and final project. | |
| SC02 | The doctoral student makes a critical assessment of achievements within the represented scientific discipline and of their own contribution to the development of the discipline. | SD\_K1 | Class participation and final project. | |
| SC03 | The doctoral student behaves in a professional manner, observes professional ethics, upholds and develops the ethos of the research and creative communities, including conducting scientific activities in an independent manner. | SD\_K5 | Class participation and final project. | |
| \*Allowed learning outcomes verification methods: exam; oral exam; written test; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests | | | | |
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| 1. Assessment criteria | | | | |
| In each class, the students will be introduced to a specific issue and asked to actively engage in group discussions. At the end of the course, each student will write a 10-page essay on a topic agreed in advance with the instructor. The final grade will be a weighted average that considers 50% active participation during classes and 50% project evaluation (10-page essay). | | | | |
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| 1. Literature | | | | |
| Primary reference:  [1] S. Okasha – "Philosophy of Science: A Very Short Introduction" (Second Edition). Oxford University Press, 2016.  Secondary references:  [1] A. Rosenberg, L. McIntyre – "Philosophy of Science: A Contemporary Introduction" (Fourth Edition). Routledge, 2020.  [2] P. Godfrey-Smith – "Theory and Reality: An Introduction to the Philosophy of Science" (Second Edition). The University of Chicago Press, 2021. | | | | |
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| 1. 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 | | | 30h (15h+15h) |
| 2 | Hours of consultations with the academic teacher, exams, tests, etc. | | | 4h |
| 3 | Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework | | | 15h |
| 4 | Amount of time devoted to the preparation for exams, test, assessments | | | 11h |
| **Total number of hours** | | | | **60h** |
| **ECTS credits** | | | | **2** |
| \*\* 1 ECTS = 25-30 hours of the PhD students work (2 ECTS = 60 hours; 4 ECTS = 110 hours, etc.) | | | | |

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| 1. 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 |