SYLLABUS "METHODOLOGY OF SCIENTIFIC AND PROJECT ACTIVITIES"

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Department responsible for the course or equivalent: ***Institute of Management in Economic, Ecological and Social Systems; Department of Philosophy***

Semester when the course unit is delivered: ***1st***

Level of course unit: ***master level***

ECTS credits: ***2***

ADMISSION REQUIREMENTS

Applicants are expected to have completed the following courses:

- Philosophy

COURSE OBJECTIVES (AIMS)

The aims of the study are

- to consider philosophical problems of science and technical knowledge in order to develop a historical and philosophical approach to the analysis of modern scientific problems and ways of development of science and technical knowledge;
- to determine the scientific worldview, the development of creative thinking and inner freedom of the individual;
- to assimilate the world philosophical inheritance, including labor problems of engineers and IT-specialists, development of equipment and technologies, especially modern high technologies;
- to form the knowledge about research methods, and also skills in using the studied methods when writing a master's thesis.

The objectives of the study are

- to form a detailed understanding of undergraduates about modern philosophy and methodology of science;
- to promote the acquisition by students of an understanding of the role of science in the development of civilization, the interaction of science and technology and the associated social, legal and ethical problems, the values of scientific rationality and its historical types, the ability to use knowledge of the structure, forms and methods of scientific knowledge;
- to teach students how to use philosophical principles and categorical apparatus in the analysis of professional, scientific and socio-ethical problems of

our time in assessing the consequences of their professional activities, in the development and implementation of socially significant projects;

- to teach how to use the historical and philosophical approach to the analysis of modern scientific problems and ways of development of science and technical knowledge;
- to form a detailed idea of theoretical and empirical methods of scientific research, areas of their application, the possibility of using it during the preparation of a master's thesis.

COURSE CONTENTS

Module 1. Philosophy and Methodology of Science

Session 1. Science as the most important form of knowledge in the modern world. The concept of science: science as an activity, a social institution and a system of knowledge. Forms of reflexive comprehension of scientific knowledge: theory of knowledge, methodology and logic of science. The problem field of the philosophy of science.

Session 2. The structure and dynamics of scientific knowledge. The problem of rationality. Types of scientific rationality. The problem of the subject and object of knowledge. Scientific and extra-scientific knowledge. Knowledge and faith. Metatheoretical level of knowledge: picture of the world, style of thinking, types of rationality. Philosophical foundations of science. The structure of empirical knowledge. The structure of theoretical knowledge. Methods of scientific knowledge and its classification. Values and its role in cognition. The problem of truth in knowledge. Internal and external determination of science. Internalism and externalism. Models of the development of science.

Session 3. Ethics of science. Merton`s concept of the ethos of science. The ethos of classical science. The ethos of non-classical science. The ethos of post-non-classical science. Freedom of scientific research and social responsibility of the scientist. Ethics of a scientist.

Module 2. Modern philosophical problems in the fields of scientific knowledge

Session 4. Philosophy of Information. Philosophical problems of artificial intelligence. Problems of philosophy of information. Basic concepts of information philosophy. Understanding the essence of the phenomenon of information is an urgent strategic problem of science in XXI. The nature of the information. The modern structure of the subject area of computer science. Philosophical problems of machine learning, the problems of developing artificial intelligence. The transformation of artificial intelligence into science. Hypothesis

of weak and strong artificial intelligence. Ethical and moral consequences of the development of artificial intelligence.

Session 5. The philosophy of technologies. Technique and technology. Features of the development of natural and technical sciences, the role of natural and technical sciences in the system of modern scientific knowledge. The role of technology in the formation of the classical mathematized experimental science. Philosophy of technology and methodology of technical sciences. Technical optimism and pessimism. Modern philosophy of technology. Socio-philosophical research and technology assessment programs.

Session 6. Social and ethical risk assessment in the field of engineers and IT-specialists. Ethics of social risk. Risk assessment. The need for risk assessment. Epistemological problems in risk assessment. Risks as predicted by side effects of development in the age of technology. Man-made disasters as the mistakes of engineers. Risks and responsibilities of computer systems. Information and computer ethics. Model for the analysis of ethical and social consequences of IT implementation. Social aspects of software development. Ethics and engineering design.

LEARNING OUTCOMES

Knowledge:

- worldview, philosophical and methodological foundations of scientific and project activities;
- conceptual and categorical apparatus of philosophy and methodology of scientific and project activities;
- philosophical and methodological aspects of the development of scientific knowledge;
- theoretical and empirical methods of scientific research.

Skills:

- ability to use philosophical and general scientific categories, principles, ideas and approaches in their own specialty;
- ability to assess the state of development of science and the modern social practice based on it;
- ability to acquire new research methods based on previously acquired knowledge;
- ability to analyze information, produce effective solutions;
- ability to apply research methods in scientific activity, in particular, while writing a master's thesis and scientific articles.

Learning Outcomes:

- development of a culture of philosophical and scientific research;
- ability to work with scientific literature, formulate scientific concepts, hypotheses, based on the studied literature;
- to have skills in working with philosophical and methodological sources;
- to own the skills of competent and effective search, selection, processing and use of information sources (reference books, Internet resources);
- development of responsibility for professional and scientific activities to the environment of human society.

PLANNED LEARNING ACTIVITIES AND TEACHING METHODS

Educational technologies used in reading the Methodology of Scientific and Project Activities course provide for the use of the following forms of classes in the educational process: lectures, seminars, presentation of reports, conferences, interviews, discussions, small group work, various forms of independent work, are also used: problem education - the formulation of problem situations and the organization of students' independent activities to resolve them, the research method of training. These educational technologies contribute to the development of the individual creative work of the student, as well as the ability to work in a team, to develop skills in applying various forms of knowledge in various fields of activity, depending on the goals set.

Comprehensive development of student discipline involves:

- student’s involvement in discussions;
- written essay;
- written abstract;
- reading and analyzing of primary sources;
- interview and testing.

ASSESSMENT METHODS AND CRITERIA

Criteria for evaluation:

Test

• Assessment of "excellent" (8-10 points) is given to a student if he/she demonstrates a deep study of the theoretical material of the lesson, actively participates in the discussion, answers questions fully, providing additional facts and examples, and is able to prove their point of view;

• Assessment of "good" (6-7 points) is given to a student if he/she gives the correct, in general, answers to all proposed questions; however, there are minor comments on the completeness and quality of the presentation;

• Assessment of "satisfactory" (3-5 points) is given to the student if he/she demonstrates an average elaboration of the theoretical material of the lesson, but does not participate in the discussion, does not answer all the questions.

• Assessment of "unsatisfactory" (less than 2 points) is given a student if he/she demonstrates a poor study of the theoretical material of the lesson, does not participate in the discussion, and is not able to answer the questions.

Essay

• Assessment of "excellent" (9-10 points) is given to the student if the essay topic is disclosed, the task set in the work is completed, the essay contains analysis and evaluation of the processed information, the logic of the narrative is sustained, a variety of material is used.

• Assessment of "good" (6-8 points) is given to the students if the claimed topic is generally disclosed, the task set in the work is completed, the essay contains analysis and evaluation of the processed information, the logic of narration is maintained, a variety of material is used, however, there are insignificant comments on the completeness and quality of the presentation of the material.

• Evaluation of "satisfactory" (3-5 points) is given to the students if there are significant deviations from the requirements for writing an essay in their works. In particular, the topic is only partially covered; actual errors in the content of the essay; there are no conclusions in the work.

• Evaluation of "unsatisfactory" (less than 2 points) is given to the students if their essay topic does not match, reveal a significant lack of understanding of the problem, arguments are scattered, inconsistent, many dubious or erroneous facts, the text is untidy and hard to read, a lot of grammatical and spelling errors.

Abstract

• Assessment of "excellent" (6 points) is given to the student if all the requirements for writing and defending the abstract are fulfilled. The problem is identified and its relevance is justified, a brief analysis of various points of view on the problem under consideration is made and its own position is logically stated, conclusions are drawn, the topic is fully disclosed, the volume is maintained, the requirements for external design are met, the correct answers to additional questions are given.

• Assessment of "good" (5 points) is given to the students if the basic requirements for the abstract and its defending are met, but there are flaws. In particular, there are inaccuracies in the presentation of the material; there is no logical sequence in judgments; the volume of the abstract is not sustained; there are design flaws; incomplete answers to additional questions during protection

• Evaluation of "satisfactory" (3-4 points) is given to the students if there are significant deviation from the requirements for abstract. In particular: the topic is only partially covered; actual errors were made in the content of the abstract or in answering additional questions; no output during protection.

• Evaluation of "unsatisfactory" (less than 2 points) is given to the students if his or her topic of the abstract is not disclosed, a significant misunderstanding of the problem is revealed. Student abstract is not presented.

COURSE LITERATURE (RECOMMENDED OR REQUIRED)

1. Staley, Kent W. An Introduction to the Philosophy of Science. Cambridge Introductions to Philosophy. Cambridge: Cambridge University Press, 2014. doi:10.1017/CBO9781139047760.
2. Elman, Colin, John Gerring, and James Mahoney, eds. The Production of Knowledge: Enhancing Progress in Social Science. Strategies for Social Inquiry. Cambridge: Cambridge University Press, 2020. doi:10.1017/9781108762519.
3. Beins, Bernard C. Research Methods: A Tool for Life. 4th ed. Cambridge: Cambridge University Press, 2018. doi:10.1017/9781108557191.
4. Beins, Bernard C., and Maureen A. McCarthy. Research Methods and Statistics. Cambridge: Cambridge University Press, 2017. doi:10.1017/9781108550734.
5. Hagengruber, Ruth, and Uwe V. Riss, eds. Philosophy, Computing and Information Science. Pickering & Chatto, n.d.
6. Writing and Publishing a Scientific Research Paper. Ed. Subhash Chandra Parija, Vikram Kate. Springer Nature Singapore Pte Ltd. 2017. DOI https://doi.org/10.1007/978-981-10-4720-6