

APPROVED BY

Director of the School of Core Engineering Education


Denis V. Chaikovsky

Philosophical and Methodological Problems of Science and Technology

Field of Study: Major 09.04.04 Software Engineering

Programme name: Big Data Solutions

Level of Study: Master Degree Programme

Year of admission: 2019

Semester, year: 1, 1

ECTS: 3

Total Hours: 108

Contact Hours: 32

- **Lectures:** 16
- **Labs:** –
- **Practical experience:** 16

Assessment: credit test

Department: Division for Social Sciences and Humanities

Head of Department


/ Lukyanova N.A.

Instructor(s)


/ Makienko M.A.

Course Name

Course Overview

Course Objectives	The objective of mastering the discipline is to develop skills of critical analysis of different philosophical issues in science based on systematic approach and developing the strategy to solve.
Learning Outcomes	<p>Upon completion of the course, a graduate will obtain the knowledge of:</p> <ul style="list-style-type: none"> – Social aspects of technologies; – Modern scientific trends; – SMART-paradigm, NBICS-paradigm; – Technology assessment, responsible research and innovation; – The history of scientific ethics starting from Hippocratic Oath to modern ethical committees; –
Course Outline	<p>The target course is taught using a variety of teaching forms such as:</p> <ul style="list-style-type: none"> – 16 lectures; – 16 practical hours. <p>The course consists of 7 sections, which are given below.</p> <p>Section 1. The philosophy of science Section 2. The methodology of science Section 3. The history of science and technology Section 4. The art of science Section 5. The philosophy of technology Section 6. Trends of science developing Section 7. The ethical assessment of science and technology</p> <p>Each section includes several practical experiences. The course ends with a credit test.</p> <p><i>Learners' self-study</i> is arranged in a form reading the relevant topics and materials. <i>Individual homework assignment</i> is a set of tasks, aimed at consolidating the knowledge gained and the development of relevant skills.</p>
Prerequisites (if available)	

Course Structure	<p>The content of the course covers 7 topics. Each topic is studied through lectures and practical experiences.</p> <p>Section 1. The philosophy of science Norms, criteria, and standards of scientific knowledge. Approaches to the definition of science: tradition and modernity. Social functions of science. Science as a form of knowledge, a social institution, a factor in the development of the economy and the state, a form of interaction between peoples. Scientific rationality in the context of the problem of cultural interaction.</p> <p>Section 2. The methodology of science The levels of scientific knowledge. Empirical level: observation, measurement, experiment. Theoretical level: abstraction, idealization, deduction, induction. Forms of scientific knowledge: problem, hypothesis, theory. Specificity of a scientific fact. Correlation of fact and theory. Integration and differentiation of scientific knowledge in the history of the development of science.</p> <p>Section 3. The history of science and technology 1. Preconditions for the emergence of science. The development of science and technology in Europe and the East. Formation of Russian science. The influence of the system of ideological values on the scientific picture of the world.</p> <p>Section 4. The art of science The concept and nature of creativity in the history of philosophy. The nature and models of scientific discovery in modern philosophy. Methods for stimulating creative thinking: a variety of approaches. Specificity of engineering creativity.</p> <p>Section 5. Language Constructions of a Scientific Text Technology and culture: areas of intersection. Engineering and Science. Regularities in the development of technology. Technical revolutions. Man and the scientific and technological revolution. Technology and the future of mankind: problems and prospects.</p> <p>Section 6. Language Constructions of a Scientific Text Formation of a new paradigm for the development of science, technology, and technology: from study to the formation, the convergence of science, technology, and technology. The specifics of modern society: knowledge society, risk society. Industry 4.0 Concept. Convergence of Science and Technology. The interdisciplinarity of modern research teams.</p> <p>Section 7. Language Constructions of a Scientific Text Scientific community: principles of scientific regulation. Ethics and morality. National and international forms and structures of regulation of scientific and engineering activities. Technology as a subject of ethical research. Experience in social evaluation of technology.</p>
Facilities and Equipment	Classroom with multimedia equipment: Tomsk, Usova street, build. 19, room 437. LMS MOODLE
Grading Policy	In accordance with Rules and Regulations System of the current control and intermediate certification in TPU the total rating on discipline is put down at the end of a semester by results of estimation of actions of the current control in a semester. For receiving total assessment "Pass" during a semester the student has to gain not less than 55 points (Max score for current assessment is 100).
Course Policy	Attendance is strictly controlled. All classes are obligatory for attendance.
Teaching Aids and Resources	Compulsory Reading: 1. The New Organon / F.Bacon [i dr.]. – M.: Uright, 2020. – 242 s. — URL: https://urait.ru/viewer/novyy-organon-442576#page/4

	<p>2. <i>Filosofia nauki. Izbrannie raboti.</i> / V.I. Vernadsky. – M.: Uright, 2020. – 458 s.</p> <p>3. <i>Pravila dlya rukovodstva uma.</i> / R. Descartes. – M.: Uright, 2020. – 97 s.</p> <p>4. <i>Philosophskie i metodologicheskie problem nauki i tekhniki.</i> / I.B. Ardashkin. – T.: TPU, 2013. – URL: http://www.lib.tpu.ru/fulltext2/m/2014/m165.pdf</p> <p>LMS MOODLE</p> <p>1. <i>Philosophskie i metodologicheskie problem nauki i tekhniki</i> (http://stud.lms.tpu.ru/course/view.php?id=195)</p>
Instructor (-s)	Makienko M.A., mma1252@tpu.ru