СПИСОК ЛИТЕРАТУРЫ

1. Mejtoft T., Vesterberg J. Integration of Generic Skills in Engineering Education: Increased Student Engagement // Proceedings of the 13th International CDIO Conference. – University of Calgary, Calgary, Canada, June 18-22, 2017.
2. Telenko C., Wood K., Otto K. et al Designettes: An Approach to Multidisciplinary Engineering Design Education.// Journal of Mechanical Design, Transactions of the ASME. –2016.–vol. 138.–no.2.–Article number 022001.
3. Ларионов В.В., Лидер А.М. Самостоятельная работа студентов технического университета (опыт ТПУ). // Высшее образование в России. –2014. – № 8–9. – С. 122 – 126.
4. Ларионов В.В., Лидер А.М., Лисичко Е.В. Непрерывный образовательный процесс на основе проектно-ориентированного обучения // Высшее образование в России. — 2011. — № 4. — С. 99–103.

HISTORY AND PHILOSOPHY OF SCIENCE COURSE FOR INTERNATIONAL PHD STUDENTS MAJOIRING IN ENGINEERING

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Annotation. *PhD students` needs analysis is the starting point for the study in the course History and Philosophy of Science especially when the course is delivered in English. After successful course completion students develop generic skills based on critical thinking. The course content is sophisticated thus students` cultural background and professional aspirations matter for the course successful delivery.*

The twenty-first century will be the century of humanitarian science,
or it will not exist. *Levi Strauss*

International students comprise 23% of the total student population at Tomsk polytechnic university (TPU) in 2019 [1]. TPU home and international students choose to study on the degree programmes delivered through the medium of English. In 2018 our University started offering the course History and Philosophy of Science for graduate and PhD students enrolled in English medium engineering programmes.

The philosophy of science as a university course and scientific field that deals with the assumptions, foundations arguing the purpose, use and merit of science [2]. The history of science is a vital university course as not knowing the scientific background it is not possible to progress further in the chosen scientific field.

This TPU course introduces students to the core issues of the philosophy of science. In particular the debates about the nature of the scientific methods, theories of confirmation, the demarcation of science from non-science, the rationality of theory change, and scientific realism are discussed. Students are exposed to the key thinkers in the philosophy of science.

The philosophy of science concerns the nature of science and what makes it distinctive among other forms of human inquiry. The problem of distinguishing genuine science from disciplines or activities that do not deserve to be called scientific is closely linked to the problem of precise characterization of the scientific method.

This course provides an introduction to this subject beginning with the origins of modern science in the Scientific Revolution in the sixteenth and seventeenth centuries, and concluding with exposure to the latest controversies among contemporary philosophers of science

including the debates about the various forms of scientific realism. While accomplishing the course students will develop an appreciation of the importance of philosophy of science within the history of philosophy and an understanding of the ideas of the most famous names in the subject, those include Bacon, Popper, Kuhn and Lakatos, others.

In our case the course syllabus is viewed as the contract between faculty and students. As such, the syllabus should not be altered after the semester has begun to ensure fairness towards the students` progress and achievement. The purpose of this syllabus is to give an idea of the philosophy of science as the branch of knowledge, its features, main schools and areas of studies; to acquaint students with the main problems of philosophy of science: scientific criteria, logic of scientific research, structure of scientific knowledge, the value of science, and ethos of science. Before proceeding with the design of the course History and Philosophy of Science, it was necessary to conduct initial analysis of the problems encountered by a teacher and students starting their teaching and learining within History and Philosophy of Science course in English language.

To achieve this goal the knowledge, skills, and competencies needed to implement this course have been analyzed. The questions for reflection and analysis included the following:

- Teacher`s role and functions and perceptions of their students (Serving as a mentor and coach, encouraging lifelong learning, sharing enthusiasm for learning, improving science literary, demonstrating that creativity and fun are sides of learning)?
- The course content, skills (Student responsibility, critical, creative and analytical thinking, questioning, problem solving, communication, the notion that science is for everyone)?
- Compliance with current requirements (different instructional strategies, learning styles and aptitudes, students engagement, use of technology for instruction, student access to real world technologies.
- Teaching methods effectiveness (reflective practices, authentic assessment, tutorials, advice and feedback from teachers, communication with students and other stakeholders).

The next step incorporates the needs analysis of graduate students` background and professional aspirations. The strategy of investigating students` needs via needs analysis is presented in [3]. It is important to find out where the students studied before and what approaches were implemented.

Secondly, the teacher is to recognise if English language is the language of training, what functions English serves for: academic, professional, scientific, everyday life communication.

Science plays an enormously influential role in our society. As a social institution, it commands enormous respect and social influence, as well as attracts substantial amount of funding.

Over the last 400 years, science has transformed human life and society. Most of what we take for granted in terms of lifestyle including communication, health and transport is unthinkable without science. Even when people find out that technology has generated environmental problems, people tend to turn to science for remedy. E.g., if a car exhausts pollution into the atmosphere, people turn to science to search for more efficient fuel or new type of engine. Science is the massive problem-solving and information-providing enterprise and, generally, arouses great respect for what has been achieved. The course we overview in this paper integrates discussions led by students and facilitated by the teacher incorporating the following questions:

- What does it mean to say that something is “scientific”?
- How can one tell valid science from bogus?
- On what basis can we assess what scientists tell us?

- How do we know if what we are being told is absolute truth or merely some temporary theory, adequate for now but soon to be replaced? What is scientific language? [4].

The goal of TPU course History and Philosophy of Science is for graduate students to receive knowledge in the history of science, develop understanding of the main philosophical fields, the role and place of science in modern society. The course History and Philosophy of Science will contribute to development of generic skills including communication skills, understanding and recognition of other cultures. Overcoming cultural shock can be the foundation of new world. University education turns into scientific diplomacy.

The research and syllabus design for the course History and Philosophy of Science for graduate students have been conducted within TPU in-house professional training system, the course Pedagogical Design and Delivery through the Medium of English in the Context of Internationalisation.

REFERENCES

1. TPU Facts. TPU official webpage Available at: https://tpu.ru/ (Assessed 23.12.2019)
2. Philosophy of Science. Stanford University, course description. Available at: https://web.stanford.edu/class/symsys130/Philosophy%20of%20science.pdf (Assessed 23.12.2019)
3. British Council. Needs Analysis in Studying English Available at: https://www.teachingenglish.org.uk/article/needs-analysis (Assessed 22.12.2019)
4. Fjällbrant N. Scholarly Communication – Historical Development and new Possibilities //http://internet.unib.ktu.lt/physics/texts/schoolarly/scolcom.htm (Assessed – 24.12.2019).