Wrocław University of Science and Technology
Doctoral School

COURSE CARD

1. Basic information

Course name in English:	Research skills	
Course name in Polish:	Warsztat badacza	
Number of hours:	30	
Type of course:	Research skills	
Form of course:	mixed forms (combnation of lecture, seminar and laboratory)	
Code of course:	W02ILT-SD0140W / ILQ100445W	
Course leader:	Prof. Łukasz Sadowski	
Faculty of the course leader:	W2 Faculty of Civil Engineering	
Email address of the course leader:	lukasz.sadowski@pwr.edu.pl	
Scientific discipline(s) assigned to the course (doctoral students representing the marked disciplines can participate in the course):	Architecture and urban planning	☒
	Automation, electronic, electrical engineering and space technologies	☒
	Information and communication technology	☒
	Biomedical engineering	☒
	Chemical engineering	☒
	Civil engineering, geodesy and transport	☒
	Materials engineering	☒
	Mechanical engineering	☒
	Environmental engineering, mining, and energy	☒
	Mathematics	☒
	Chemical sciences	☒
	Physical sciences	☒
	Management and quality studies	☒

2. Objectives

1. To acquaint with the principles of operation of the doctoral school, basic legal acts, scientific fields and disciplines, the path of the academic career and the principles of promotion.
2. To gain skills of searching for scientific knowledge.
3. To gain skills related to related to methodology and conducting scientific research.
4. To gain skills required to prepare the presentation of the results of scientific research including copyright, public presentations and presentation of academic achievements.
5. To gain skills necessary to prepare and write scientific articles.
6. To gain skills required to acquire funds for research and to prepare applications for research funding.
7. To gain skills of scientific cooperation in research teams, including international ones.
8. Acquainting with the basic principles of ethics in scientific research.
9. To gain basic knowledge in the field of knowledge transfer and commercialization of research results.

3. Content

Detailed information about the course content, including topics and form of classes.

No.	Topic	Number of hours	Form of classes
1	Academic career (principles of a doctoral school, basic legal acts, scientific fields and disciplines, academic career path, principles of promotion)	2	lecture
2	Searching for scientific knowledge	2	lecture
3	Methodology and conducting scientific research	2	lecture
4	Presentation of the results of scientific research, copyrights in presentations, public presentations and presentation of academic achievements	4	lecture
5	Preparation and writing of scientific articles	4	lecture
6	Acquiring funds for research and preparation of applications for research funding	2	lecture
7	Scientific cooperation in research teams, including international ones	2	lecture
8	Ethics in scientific research	2	lecture
9	Knowledge transfer and commercialization of research results	2	lecture
10	Delivering a multimedia presentation on a selected topic related to the planned PhD thesis	6	seminar
11	Preparation of final report	-	Select form
12	Review of final report	2	seminar
13	Total hours	30	Select form

4. Prerequisites

List of prerequisites relating to knowledge, skills and other competences for course participants.

1. Having a basic knowledge of a given discipline at the second level of studies.
2. Having a predefined research topic related to realized PhD thesis.

5. Learning outcomes

List of learning outcomes at level 8 of the Polish Qualifications Framework assigned to the course (mark the learning outcomes in the last column).

Symbol	**Learning outcome**	
	KNOWLEDGE. Doctoral student knows and understands:	
SzD_W3	the main trends in the development of the scientific or artistic disciplines covered in the curricula;	☐
SzD_W4	research methodology;	☒
SzD_W5	the rules for the dissemination of scientific results, including in open access mode;	☒
SzD_W6	the fundamental dilemmas of modern civilization;	☒

SzD_W7	the legal and ethical conditions of scientific activity;	☐
SzD_W8	the economic and other relevant conditions of scientific activity;	☒
SzD_W9	basic principles of knowledge transfer to the economic and social spheres and commercialisation of results of scientific activity and know-how related to these results.	☒
	SKILLS. Doctoral student is able to:	
SzD_U2	use knowledge from different fields of science or art to creatively identify, formulate and innovatively solve complex problems or perform research tasks, in particular: - define the purpose and subject of scientific research, formulate a research hypothesis, - develop research methods, techniques and tools, and use them creatively, - draw conclusions on the basis of scientific research; critically analyse and evaluate the results of scientific research, expertise and other creative work and their contribution to knowledge development; transfer the results of scientific activities to the economic and social spheres;	☒
SzD_U3	communicate on specialised topics to the extent that they enable an active participation in the international scientific community;	☐
SzD_U4	disseminate research results, including in popular forms;	☒
SzD_U5	initiate debates and participate in a scientific discourse;	☐
SzD_U6	be able to speak a foreign language at B2 level of the Common European Framework of Reference for Languages to a level that enables them to participate in the international scientific and professional environment;	☐
SzD_U7	plan and implement an individual or collective research or creative activity, including in an international environment;	☒
SzD_U8	independently plan and act for one's own development and inspire and organize the development of others;	☐
SzD_U9	plan classes or groups of classes and implement them using modern methods and tools.	☐
	SOCIAL COMPETENCES. Doctoral student is ready to:	
SzD_K3	fulfilling the social obligations of researchers and creators, initiate public interest activities, thinking and acting in an entrepreneurial way;	☒
SzD_K4	maintaining and developing the ethos of research and creative environments, including: - carrying out scientific activities in an independent manner, - respecting the principle of public ownership of research results, taking into account the principles of intellectual property protection.	☒

6. Evaluation

Short description of the method(s) used to evaluate the learning outcomes assigned to the course, e.g., exam, test, report, presentation, etc.

Preparation of final report, delivering a presentation, activity in group discussion

7. Teaching methods

Short description of the teaching methods used during the course, e.g., multimedia presentation, discussion, literature studies, developing written documents, own work, etc.

Lecture, presentation, discussion, self work

8. Literature

List of primary and secondary literature used to prepare the course and including additional knowledge for participants, e.g., books, textbooks, research papers, standards, web pages, etc.

1. Berger, R. (2014). A Scientific Approach to Writing for Engineers and Scientists. Wiley-IEEE Press.
2. Kraicer, J. (1997). The art of grantsmanship. Toronto: University of Toronto.
3. Legal acts.
4. Search tools, e.g., http://scholar.google.pl/, https://www.researchgate.net, https://www.scopus.com, http://www.sciencedirect.com/, http://www.link.springer.com/.
5. Databases of patent offices.
6. Literature related to a particular scientific discipline.
7. Regulations of research funding institutions (MNiSW, NCN, NCBR, FNP).

9. Other remarks

Additional remarks, comments, (e.g., language of the course)

Course in English, own laptop is welcome