COURSE DESCRIPTION CARD - SYLLABUS

Course name
METHODOLOGY OF SCIENTIFIC RESEARCH [S5SD1>MBN]

Course

Proposed by Discipline
–

Year/Semester
1/1

Level of study
Doctoral School

Course offered in
English

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
6

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

prof. dr hab. inż. Krzysztof Wisłocki
krzysztof.wislocki@put.poznan.pl

Lecturers

prof. dr hab. inż. Krzysztof Wisłocki
krzysztof.wislocki@put.poznan.pl

Prerequisites

Knowledge: student has the basic knowledge of the terms: knowledge and science. He should know and understand main targets of his future doctoral work. He should know the actual state of specific knowledge development in the area he is interested in. Skills: student is able to recognize and explain the basics of causal relationships in the field of knowledge of interest to him. He should be able to describe them in logical and grammatically proper way. Student knows the rules of preparing promotional works for BSc and MSc degree. Social competences: student is able to operate in the student group, playing different rules in it. He can define priorities when he solves defined tasks. Student exhibits the independence in problem solving, the acquisition and improvement of acquired knowledge and skills. Student should be strongly motivated to continue and develop scientific works.

Course objective

The aim of the subject is to teach and prepare students for the performance of scientific work and editing their description, in particular for the development of a doctoral thesis. Student should learn the main rules of logical thinking and adequate creation of a scientific narration appropriate to the Ph.D. degree and to obtain scientific qualifications.

Course-related learning outcomes

Knowledge

A PhD student who graduated from doctoral school knows and understands:
1. basic concepts in the field of methodology and methodology of scientific work and their interpretation, understanding of the objectives and tasks of scientific works, [P8S_WG/SzD_W01]
2. the phases of the process of creative thinking, the process of the formation of doctoral thesis, the description of the process of implementation of the work, the structure of the scientific work, [P8S_WG/SzD_W02], [P8S_WG/SzD_W03]
3. the principles of creating work concepts and its outline, formulating topics and work titles, defining the area and direction of study and research, determining the scope of knowledge and ignorance, formulating a re-search problem and research questions, formulating also working hypotheses, main purpose, intermediate objectives, specific tasks, rules for the processing of source materials, test method selection, description of the experimental test methodology, determination of the nature of the expected results. [P8S_WG/SzD_W03], [P8S_WG/SzD_W04]

Skills
A PhD student who graduated from doctoral school can:
1. develop own ability to create a concept of scientific work, and formulate scientific research questions, scientific questions, [P8S_UW/SzD_U01], [P8S_UW/SzD_U02]
2. demonstrate the ability to formulate a methodology for solving scientific problems, choosing an adequate experimental method and properly formulating its objectives and tasks, [P8S_UW/SzD_U03]
3. demonstrate own knowledge of the general principles of writing scientific texts, grammatical, stylistic and technical editors. [P8S_UK/SzD_U04]

Social competences
A PhD student who graduated from doctoral school is ready to:
1. understands the need and possibilities of continuous learning, knows the need to gain new knowledge in order to his professional development; he is able to identify and formulate scientific problems, [P8S_KK/SzD_K01], [P8S_KK/SzD_K02]
2. consciously and deliberately select research methods for solving scientific problems and to describe them in the proper way, [P8S_KO/SzD_K06]
3. describe in competent way research problems he carried out. [P8S_KR/SzD_K07]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The doctoral student prepares:
- an individual description of the own proposal of dissertation including points and definitions described in the presentation to the lecture, mention above in paragraph Knowledge,
Assessment criteria:
evaluation by Lecturer the student's ability of formulation of topics and work titles, defining the area of research, determining the scope of knowledge and ignorance, formulating a research questions and working hypotheses;
- an individual description of the own concept of dissertation including definitions and description included in the presentation to the lecture, mention above in paragraph Skills,
Assessment criteria:
evaluation by Lecturer the formulated methodology for solving scientific problems, choosing an adequate experimental method and properly formulating its objectives and tasks;
- an individual description of the own concept of dissertation including descriptions and suggestions included in the presentation to the lecture, mention above in paragraph Social competences,
Assessment criteria:
evaluation by Lecturer of student's determination to gain new knowledge in order to his professional development.

Programme content

1. Basic definition of knowledge and science (In the lecture the methodologically proper way of searching for new, unsolved scientific problem will be described and discussed. Main rules of formulation scientific problem will be presented and main differences between thesis and hypothesis will be discussed).
2. Organization of the research work for preparing scientific publications (General rules for defining of intermediate objectives, specific tasks will be introduced. Discussion on Methods of scientific research. Main rules for the processing of source materials, test method selection, description of the experimental

test methodology, determination of the nature of the expected results).
3. Preparing scientific papers, publications (Discussion on the originality of the work and copyright restrictions. Formulation of necessary preparation steps. Main rules of preparing of Abstract and Introduction to any scientific publication. Describing of the Area and directions of studies and research. Studies on literature and other sources for detecting of the range of knowledge and ignorance. Formulating of conclusions, observations, notes from the performed scientific work).
4. Structure of scientific work, project or publication (Main parts and chapters of the work. Describing the Investigations, Analysis and interpretation of investigation results. Summing-up and conclusions. Rules of preparing the Bibliography / Literature and Attachments).

Course topics

1. Basic definitions: science, research, development, promotable work, dissertation and its expected structure, scientific methodology.
2. Rules, legal basics and procedure of conferring Ph.D. degree.
3. Main requirements for preparing the dissertation and necessary preparation steps.
4. Preparing main concept of dissertation by answering 10 basic questions.
5. Formulation of research problem and main goals, selecting and defining of the proper research methods.
6. Main rules for formulating final conclusions and the expected novelty of the research.
7. General principles of writing scientific texts and papers.

Teaching methods

Lecture: multimedia presentation including definition, their interpretations, illustrations and examples.

Bibliography

Basic
1. Wislocki K.: Methodology and editing of scientific works. Script for lectures (PDF), 2022, ss. 90.
2. Wislocki K.: Metodologia i redakcja prac naukowych. Wyd. PP. Poznań 2013
3. Aarne Mämmelä: How to Get a Ph.D.: Methods and Practical Hints. II International Interdisciplinary Technical Conference of Young Scientists 20-22 May 2009, Poznan, Poland.
4. W. Goddard and S. Melville, "Research methodology", 2nd ed., Lansdowne, South Africa, Juta & Co Ltd. 2004.

Additional
1. R. K. Jain and H. C. Triandis, "Management of research and development organizations", 2nd ed., New York, John Wiley & Sons 1997.
2. R. A. Oay, "How to write and publish a scientific paper", 5th ed., Phoenix, AZ, Oryx Press 1998.
3. Z. Michalewicz and O. B. Fogel, "How to solve it", 2nd ed., Berlin, Springer 2004.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	6	0,00
Doctoral student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation)	19	1,00