Politechnika Wrocławska

Introduction

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This course is about practical aspects of doing a PhD:

- research,
- publishing,
- funding,
- academic career.

Course card

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 (combination of lecture, seminar and laboratory)	
Code of course:		
Course leader:	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, and electrical engineering	☒
	Information and communication technology	☒
	Biomedical engineering	☒
	Chemical engineering	☒
	Civil engineering and transport	☒
	Mechanical engineering	☒
	Environmental engineering, mining, and energy	☒
	Mathematics	☒
	Chemical sciences	☒
	Physical sciences	☒
	Management and quality studies	☒

Ice breaker

Before we start, I would like to know
„who you are and what you are working on?”.

Name
Department
PhD topic (one sentence)
20 seconds per person

„What is the biggest challenge in your PhD right now?"

Ice breaker

This course is not about theory. It is about how to survive and succeed during a PhD.

How to choose a research problem?
How to publish papers?
How to get research funding?
How to build scientific network?
How to manage your PhD project?

Learning outcomes

After this course you should be able to:

- formulate a clear research problem,
- search scientific literature efficiently,
- prepare a scientific article,
- apply for research funding,
- present your research results.

Literature:

- Berger, R. (2014). A Scientific Approach to Writing for Engineers and Scientists. Wiley-IEEE Press.
- Kraicer, J. (1997). The art of grantsmanship. Toronto: University of Toronto.
- Legal acts.
- 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/.
- Databases of patent offices.
- Literature related to a particular scientific discipline.
- Regulations of research funding institutions (MNiSW, NCN, NCBR, FNP).

Other remarks:

- Course in English, own laptop is welcome.

Timeline of the course

Lecture 1 – Academic career
Lecture 2 – Searching scientific knowledge
Lecture 3 – From research gap to methodology
Lecture 4 – Scientific publishing
Lecture 5 – Research funding
Lecture 6 – Research collaboration
Lecture 7 – Presentations and discussion

Exercise (5 minutes)

Write in one sentence:

"My PhD research problem is: ...„

Then we will discuss 2–3 examples.

Is it specific?

Is it measurable?

Is it interesting?

Course evaluation

Final grade:

Presentation – 2 points

Summary report – 2 points

Activity in discussions – 1 point

Bonus: submitted paper or grant proposal +0.5

Summary report

Should be prepared according to the table of contents below. The report should be sent in **PDF format (file size max. 2 MB) to the e-mail lukasz.sadowski@pwr.edu.pl** at the latest during the last class:

1. Searching for scientific knowledge:

- Characterize your research using 4 keywords and list the 10 most cited articles in your field found in Scopus,
- Provide the addresses of 3 researchers' websites in your field.
- List 3 doctoral dissertations of scientists in their field.
- List 3 patents in their field.

2. Methodology and research planning:

- Formulate a research problem in one sentence.
- Identify the resources needed to conduct your research and how to obtain them.
- Develop a list of literature sources showing how to conduct research and analyze data on the subject of your research.
- Develop a schedule for carrying out your research.
- Develop a list of possible risks to carry out your research.

Summary report

3. Presentation of research results, copyrights in presentations, public speeches, presentation of scientific achievements:

- Prepare a multimedia presentation for 20 minutes on the topic of the doctorate.
- Set up your own profile on Google Scholar, ResearchGate and Orcid.
- Select and observe the 10 Lead Scientist Profiles on ResearchGate.
- Find 5 "master" scientist WWW pages.
- Choose 1 best method of presenting your achievements in a given field (e.g. scientific profile, own website, etc.).
- Find 5 authors from your own field with the best achievements in databases (Hirsh index, number of citations).

4. Preparation and writing of scientific articles:

- Present the best article you have read so far and justify why this article is the best.
- Present the worst article you have read so far and justify why this article is the worst.
- Analyze the speed of the review process and the position on the list of the Ministry of Higher Education in selected 10 scientific journals in your field.
- Select 3 scientific journals in your field with the fastest review process and the highest number of points from the Ministry of Higher Education.

Summary report

5. Acquiring funds for research and preparing applications for research funding:

- Carefully read the documentation related to the Preludium competitionand prepare a list of questions / issues for discussion related to this competition (a few sentences).
- Check other possibilities of obtaining funds for research for PhD students, possibly prepare a list of questions / issues for discussion related to these competitions (a few sentences).

6. Scientific cooperation in research teams, including international ones:

- Specify with which research teams from outside the Wrocław University of Science and Technology the scientific cooperation is planned during the implementation of the doctorate
- Specify with which companies the scientific cooperation is planned during the doctorate implementation

PhD survival rules

1. Choose a clear research question
2. Publish early
3. Build international collaboration
4. Manage your time
5. Don't work alone

Typical PhD mistakes

1. No clear research problem
2. Reading too little literature
3. Too many experiments
4. No publication strategy
5. Poor time management

Students with disabilities and special needs

Students who, due to their health condition, disability or other objective reasons, may have special needs related to classes leading, crediting method or materials preparation are asked to report for consultations or after the classes, write such information in a private chat or write an e-mail about the matter. I will try to ensure that during my classes everyone has an equal right to gain knowledge and its' crediting.

"What was the most useful thing from today's class?"