



**University of Miskolc**  
**Faculty of Materials Science and Engineering**  
**Antal Kerpely PhD School on Materials Science**  
**and Engineering**



# The Art of Doing Science

George Kaptay, professor

**COURSE DESCRIPTION**

**SEPTEMBER, 2016**

# The Art of Doing Science

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Dr. George Kaptay, professor, corresponding member of the Hungarian Academy of Sciences, Institute of Physical Metallurgy and Nanotechnology, Head of Department of Nanotechnology.

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## Target group of the course:

Compulsory for each PhD student, but not included in the list of courses for the final exam.

## Language

English

## Goal of the course

To teach general methodology of doing science, conducting research, publishing papers, presenting talks, filing patents and communicating with financing authorities, including TRL levels, ethics of science and sciento-metrics.

## Methodology of the course

Classroom presentations, using all possibilities of in-situ internet, including Web of Science, Google Scholar and the home pages of leading scientific journals.

## Subjects covered

1. The framework of science. A researcher and an artist. Researcher types, scientific degrees and job titles. The R+D of Hungary and EC.
2. How to conduct research: selecting the field of research and the particular subject for research, literature search, identification of a knowledge gap and the scientific goal, hypotheses, experimental plan, conducting and documenting and evaluating the experiments, model-development, decision making (what is next?).
3. The criteria of the correct scientific claim.
4. The form of knowledge transfer: writing a PhD thesis.
5. Publishing houses, as profit-oriented organizations and their product, the scientific journals.
6. Communication between the journal editor, the reviewers, the authors and the back office.

7. Selection of a list of journals to publish your results. Writing your paper and its electronic submission.
9. What the reviewers are doing and what is their benefit?
10. Sciento-metrics: evaluation of the journals.
11. Sciento-metrics: evaluation of individuals; the effect of co-authors.
12. Basic principles pf ethics in science. The major scientific sins.
13. Filing patents: for what and how?
14. Communication with decision makers: TRL levels.

## References

- E.Garfield: Citation indexing. Wiley Interscience, 1979.  
T.S.Kuhn: The structure of scientific revolutions. 1965.  
D De Solla Price: Little science – big science. 1979  
Simonyi K.: The cultural history of physics. Budapest. 1986.  
J.Gribbin: Science. A history. 1543-2001. Penguin Books, London, 2003.

## Evaluation of students performance

Oral exam on the above list of subjects.

## List of questions for the complex exam

None, as this course is not in the list of the final exam.