The list of subjects of the electronic course "The Art of Doing Science"

Fall 2021 by professor George Kaptay, University of Miskolc, Hungary

Timing[1]: Tuesdays from 1:30 pm to 3:30 pm Hungarian time (= from 6:30 pm to 8:30 pm Jakarta time) on the following dates: 28 September, 5 October, 19 October, 26 October,

Due to time shift in Hungary: Tuesdays from 12:30 pm to 2:30 pm Hungarian time (= from 6:30 pm to 8:30 pm Jakarta time) on the following dates: 9 November, 16 November, 23 November. Please, click:

https://meet.jit.si/Classes-by-George-Kaptay

Lecture 1, 28 September 2021: https://youtu.be/BfMx0e98-b0

Chapter 1. Framework of science

1. Science vs art, scientist vs researcher, science vs pseudo-science and religion, science vs politics, R+D+I.
2. The double language of science (a national language + English) and some suggestions.
3. Types of research and researchers (basic, targeted basic, applied, problem-shooting).
4. Bosses in research and financing research.
5. Degrees and positions in science.
6. Jobs for researchers and financing research.
7. The number of researchers and universities around the world.
8. Possible sources of scientific information.

Lecture 2, 5 October 2021. https://youtu.be/Dot_dUWYjFs

Chapter 2. A short history of science and the system of science

9. From Big Bang to civilizations (-13.8 G … -12 k).
10. The birth and temporary death of science (-600 … 400).
11. Saving science through (400 … 1600) and the birth of modern science (since 1600).
12. The ideal conditions of doing science.
13. Progress of science within and through paradigms.
14. Structure of science (from languages towards professions).
15. The system of quantities and base / derived units.
16. The scientific development from definitions through correlations towards paradigms.

[1] Subject to reginal time-shift; if that happens, a note will be circulated.

Lecture 3, 19 October 2021. https://youtu.be/jPC79k10cdM

Chapter 3. How to produce new knowledge

17. First steps to become a scientist: select and check your topic and supervisor.
18. Search literature for a specific subject, identify a knowledge gap and set your research goal.
19. Make a hypothesis and a research plan to prove / disprove / improve your hypothesis.
20. Perform and document your research / survey and make primary conclusions.
21. Possible exit options after each cycle of experiments.
22. Model your results: from hand-waving explanations towards theoretical models.
23. Theoretical models for the same subject with 3 different initial conditions (an example).
24. The method of Déscartes for building models.
25. Formulating your new knowledge: the 4 criteria of a perfect scientific claim.
26. Possible exit options with the ready claim in your hands.

Lecture 4, 26 October 2021. https://www.youtube.com/watch?v=HnVqGpts0HA

Chapter 4. Dissemination of the new knowledge (part 1)

27. Types of knowledge dissemination and the list of publication (public and private) and independent citations.
28. Publishing houses and their journals, the major players in the publishing game.
29. The algorithm of publishing.
30. Types of journal papers.
31. Measuring the excellence of a journal by impact factor of Web of Science.
32. Measuring the excellence of a journal by SJR / Q-s of Scimago.

Lecture 5, 9 November 2021. https://www.youtube.com/watch?v=iB62RRDmwtI

Chapter 4. Dissemination of the new knowledge (part 2)

33. Financing possibilities of scientific journals (the 3 possible sources of income).
34. Open access - a bright side of it: institutional licence and more citations.
35. Open access - a dark side of it: predatory journals and predatory publishing houses.
36. Selection of the best journal(s) for your next paper.
37. Parts of a scientific paper and the optimal way of writing it.
38. You as an author: submission and tracking your paper until it is published.

Lecture interrupted here due to power blackout in Miskolc, sorry.

Lecture 6, 16 November 2021. https://www.youtube.com/watch?v=Fiditr2713o

Finishing Chapter 4

39. You as a reviewer: reviewing papers.
40. Chapters of an ideal PhD Thesis / Dissertation, and the ideal way of writing it.

Chapter 5. Measurement of scientific excellence of individuals (part 1)

41. Why measuring the impossible? And what is the criterion of correctness?
42. The dynamics of increasing the numbers of your papers and citations.
43. What can be / what is worth to measure for the scientific excellence of individuals?
44. The definition, praise and criticism of the h-index.

Lecture 7, 23 November 2021. https://youtu.be/mjDz1kV0-js

Chapter 5. Measurement of scientific excellence of individuals (part 2)

45. The problems with the h-index and why a new index should be created.
46. Introducing the hh-index for improved estimation of scientific excellence of individuals.
47. Planning your scientific carrier: how many papers to publish per year and where?
48. The definition, praise and criticism of the "composite score": the best 100,000 scientists".

Lecture 8, 7 December 2021. https://www.youtube.com/watch?v=Gt77e-sJ_Is

Chapters 6-10. Other subjects

49. Ethical rules to conduct research and write/submit publications.
50. The patenting game: a social deal. What to patent and what not to patent? Inventors vs owners and the deal between them. What are the chapters of a perfect patent?
51. TRL = Technology Readiness level: the art of communication to get cash to develop your ideas into a product.
52. Ranking the universities (QS): definition, praise and criticism of.
53. How to motivate individuals within institutions / countries to improve their performance?

Extra: The influence of "scientific friends" on the number of citations of multi-authored papers (why it is not a big problem to apply the hh-index instead of the h-index?)