

Syllabus

Social Studies Of Science, Technology And Innovation (1 year)
(3 ECTS)

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Course director:

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1. Course Description

The course is delivered to master students of The National Research University Higher School of Economics. It is delivered in one module. The course length is 114 academic hours in total of which 34 hours are class room hours for lectures and seminars and 80 hours are devoted to self study.

a. Pre-requisites

Formative reading

b. Abstract

The course provides an overview of theoretical approaches that help in conceptualising scientific and technological development and innovation processes in contemporary societies. During the course students will learn about philosophical background, historical and institutional contexts of STI studies including the analysis of both classical and contemporary theoretical works as well as particular cases that will be used as examples or illustrations of the covered topics. Some or all of the following topics will be covered in the course: the evolution and development of approaches to analyze the phenomena of technoscience and technology, science and society interactions, public engagement in innovation development. The course welcomes all those interested in sociology of science, history and philosophy of science and technology, science, technology and innovation studies.

c. Course language

English

2. Learning objectives

The overall aim of the course is to examine some of the different ways of analysing and understanding social organisation of STI and their role in society. It explores the ways STI are shaped by social, economic, political and organisational factors. The course introduces a range of analytic perspectives on STI – drawing upon history, philosophy, economics and the sociologies of science & technology. In particular, the course is aimed at:

- Understanding of the importance and connectedness of the fields of science, technology and innovation for societal development.
- Clarification of basic concepts used in literature to describe science, technology and innovation as socially shaped phenomena.
- Reflection on key tensions that appear in scientific papers standing for different approaches to conceptualisation and analysis of STI-related issues.

3. Learning outcomes (competencies)

After completing the study of the course "Social Studies of Science, Technology and Innovation" the student should:

- Know main theoretical approaches that help in conceptualizing S&T development and innovation processes in contemporary societies;
- Know philosophical background, historical and institutional contexts of STI studies;
- Be able to explain basic concepts used in literature to explain STI development as socially shaped phenomena;
- Posses abilities to understand and present scientific articles;
- Posses abilities to discuss at highly professional level topics related to the social organization of STI and their role in society;
- Posses abilities to come up with own research proposals.

4. Thematic Plan

The course spans one academic module. The teaching is based on selected writings and experiences of faculty members.

Lectures are organised in order to clarify major concepts and categories used in social sciences to describe STI development processes. The course integrates philosophical, sociological and economic views on growth of knowledge, technology development and diffusion of innovations. Seminars will follow lectures. They are aimed at sharing participant's reflections on the approaches introduced in the literature and developing analytical abilities required to discuss at highly professional level topics aroused during the course.

a. Lectures

| Section | Topic |
|-------------------|--|
| Introduction | How to think about STI? |
| Science | Social and intellectual organization of the sciences |
| | Intellectual dynamics and social conditions for scientific change |
| Technology | What is social about technology and what is technical about society? |
| | Design, adoption and reinvention of technologies |
| Innovation | From invention to innovation: evolution of innovation studies |
| | Open-innovation: a theoretical concept or practical imminence |
| Conclusion | Ethics, power, and other social drivers of STI |

b. Seminars

Seminars are conducted in a form of colloquium and consist of practical sessions and moderated discussions that will provide students with indispensable abilities for social analysis of STI development.

5. Programme Contents

Basic literature for the course:

Sismondo, S. (2010). *An introduction to science and technology studies*. Chichester: Wiley-Blackwell.

1. *How to think about science, technology and innovation?*

Lecture provides critical review of mainstream studies in STI and introduce alternative approaches for description and analysis of “well-developed” issues.

Basic literature:

Sismondo S. *Introduction to Science and Technology Studies*. Chichester: Wiley-Blackwell. Ch. 1. The Prehistory of Science and Technology Studies.

Marianne de Laet and Annemarie Mol. The Zimbabwe Bush Pump: Mechanics of a Fluid Technology. *Social Studies of Science* 30/2(April 2000), 225-63.

Additional literature:

Fuchs, Stephan. 2001. «What Makes Sciences “Scientific?”». In *Handbook of sociological theory*. Springer: 21–35.

Godin, Benoît. 2012. «“Innovation Studies”: The Invention of a Specialty». *Minerva* 50(4):397–421.

2. *Social and intellectual organization of the sciences*

What is science and what is scientific knowledge? How and by whom science is socially constructed? What are the social factors that shape scientific development?

Basic literature:

- Hagstrom W.O. Traditional and Modern Forms of Scientific Teamwork, *Administrative Science Quarterly*, Vol.9 №3, 1969
- Price, Derek J and Beaver, Donald. 1966. Collaboration in an Invisible College, *American Psychologist*, Vol.21, Issue 11.
- Knorr-Cetina, Karin D. 1982. «Scientific Communities or Transepistemic Arenas of Research? A Critique of Quasi-Economic Models of Science». *Social Studies of Science* 12(1): 101–30.

Additional literature:

- Adler, Emanuel, Peter M. Haas. 1992. «Conclusion: Epistemic Communities, World Order, and the Creation of a Reflective Research Program». *International Organization* 46(1):367–90.
- Bloor, David. 1991. *Knowledge and Social Imagery*. University of Chicago Press
- Bourdieu, P. 1975. «The Specificity of the Scientific Field and the Social Conditions of the Progress of Reason». *Social Science Information* 14(6):19–47.
- Glaser, Jochen. 2001. «'Producing Communities' as a Theoretical Challenge». TASA 2001 Conference, The University of Sydney, 13-15 December 2001
- Haas, Peter M. 1992. «Introduction: Epistemic Communities and International Policy Coordination». *International Organization* 46(1):1–35.
- Kornfield, William A, and Hewitt, Carl. 1981. «The Scientific Community Metaphor», *IEEE Transactions on Systems, Man, and Cybernetics*, Vol. SMC-11, №1
- Kuhn, Thomas S. 1962. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.
- Merton, RK. 2010. «The Matthew Effect in Science». *Berliner Journal Fur Soziologie* 20(3):285–308.
- Whitley, Richard. 2000. *The Intellectual and Social Organization of the Sciences*. Oxford University Press.

3. *Intellectual dynamics and social conditions for scientific change*

What is scientific change and why it is important? Where scientific change derives from and how it flows? What are social conditions of scientific change?

Basic literature:

- Frickel, S., N. Gross. 2005. «A General Theory of Scientific/intellectual Movements». *American Sociological Review* 70(2): 204–32.
- Fuchs, Stephan. 1993. «A Sociological Theory of Scientific Change». *Social Forces* 71(4): 933-953.

Additional literature:

- Kuhn, Thomas S. 1962. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press. Chapters IX and X.
- Latour, Bruno and Steve Woolgar. 1979. *Laboratory Life: The Social Construction of Scientific Facts*. London and Beverley Hills: Sage Ch. 5
- Lamont, Michele. 1987. «How to Become a Dominant French Philosopher: The Case of Jacques Derrida». *American Journal of Sociology* 93(3): 584-622.
- McLaughlin, Neil. 1998. 'How to Become a Forgotten Intellectual: Intellectual Movements and the Rise and Fall of Erich Fromm.' *Sociological Forum* 13(20): 233-246.
- Mullins, NC. 1975. «Development of scientific disciplines - internal and external origins of change». *Sociologie et societes* 7(1):133-42.
- Lakatos, Imre 1970. *Falsification and the Methodology of Scientific Research Programmes*. In *Criticism and the Growth of Knowledge: Proceedings of the International Colloquium in the Philosophy of Science*. Ed. by Lakatos, Imre and Musgrave, Alan. Cambridge University Press

4. *What is social about technology and what is technical about society?*

How technologies are socially shaped? How technology and society interaction is possible?

Basic literature:

- Bijker, Wiebe E., Thomas Parke Hughes, T. J. Pinch, Ed. 1987. *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. Cambridge, Mass.: MIT Press.

Additional literature:

- Akrich, M. (1992). *The De-Description of Technical Objects*. In W. Bijker and J. Law (Eds.) *Shaping Technology, Building Society: Studies in Sociotechnical Change*. Cambridge, Mass, MIT Press: 205-224.
- Klein, H. K., D. L. Kleinman. 2002. «The Social Construction of Technology: Structural Considerations». *Science, Technology & Human Values* 27(1):28-52.
- Latour, Bruno. 1992. *Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts* (<http://www.bruno-latour.fr/sites/default/files/50-MISSING-MASSES-GB.pdf>)
- MacKenzie, Donald A., Judy Wajcman. 1999. *The Social Shaping of Technology*. Buckingham [England]; Philadelphia: Open University Press.
- Pinch, Trevor J., Wiebe E. Bijker. 1984. «The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other». *Social Studies of Science* 14(3):399-441.
- Shapin, Steven. 2011. *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*. Princeton, NJ: Princeton University Press.
- Verbeek, Peter-Paul. 2008. «Morality in design: Design ethics and the morality of technological artifacts». In *Philosophy and design*. Springer: 91-103.

5. *Design, adoption and reinvention of technologies*

How technologies are designed and disseminated in society? What social factors are shaping technology adoption processes? Why some technologies are accepted and others are put aside?

Basic literature:

Latour, Bruno. 1993. «Ethnography of a “High-tech” case – About Aramis. In *Shaping Technology-Building Society. Studies in Sociotechnical Change*, Wiebe Bijker and John Law (editors), MIT Press, Cambridge Mass. pp. 225-259, 1992 [new expanded and revised version of article (35). Republication in the reader Johnson, Deborah J., and Jameson M Wetmore, eds. *Technology and Society, Building Our Sociotechnical Future*. Cambridge, Mass: MIT Press, 2008 pp. 151-180].

Wyatt, Sally. (2008). "Technological Determinism Is Dead; Long Live Technological Determinism." In *The Handbook of Science & Technology Studies*, ed E. Hackett, O. Amsterdamska, M. Lynch, and J. Wajcman, Cambridge, MA, USA: MIT Press. Pp. 165-181.

Additional literature:

Bijker, Wiebe E., John Law. 1992. *Shaping technology/building society: Studies in sociotechnical change*. MIT press.

Hienert, Christoph. 2006. «The commercialization of user innovations: the development of the rodeo kayak industry». *R&D Management* 36(3):273–94.

Latour, Bruno, Catherine Porter, и Paul N. Edwards. 1997. «Aramis or the love of technology». *ISIS-International Review Devoted to the History of Science and its Cultural Influence* 88(2):322–23.

Oudshoorn, Nelly, Trevor Pinch. 2005. *How Users Matter: The Co-Construction of Users and Technology*. Cambridge, Mass.: The MIT Press.

Von Hippel, Eric. 2005. «Democratizing Innovation: The Evolving Phenomenon of User Innovation». *Journal for Betriebswirtschaft* 55(1):63–78.

6. *From invention to innovation: evolution of innovation studies*

What is innovation and how it differs from technologies and inventions? What is needed for innovation to start? How innovation succeed?

Basic literature:

Cahill, Geraldine. 2010. «Primer on Social Innovation A Compendium of Definitions Developed by Organizations Around the World». *The Philanthropist* 23(3).

Godin, B. 2006. «The Linear Model of Innovation: The Historical Construction of an Analytical Framework». *Science, Technology & Human Values* 31(6):639–67.

Additional literature:

Akrich, Madeleine, Callon, Michel, Latour, Bruno. 2002. The key to success in innovation part I: The art of interissement. *International Journal of Innovation Management*. Vol. 6, No. 2 (June 2002) pp.187-206

- Godin, Benoît. 2010. «Innovation Without the Word: William F. Ogburn's Contribution to the Study of Technological Innovation». *Minerva* 48(3):277–307.
- Granovetter, Mark. 1983. «The strength of weak ties: A network theory revisited». *Sociological theory* 1(1): 201–33.
- Murray, Robin, Julie Caulier-Grice, Geoff Mulgan. 2010. *The open book of social innovation*. National Endowment for Science, Technology and the Art.

7. *Open-innovation: a theoretical concept or practical imminence*

What are the latest news from innovation studies? Open-innovation: a buzz-word or a new paradigm? How to deal with open-innovation concept?

Basic literature:

- Chesbrough, H. W. 2003. «The Era of Open Innovation». *Mit Sloan Management Review* 44(3):35–41.
- Trott, Paul, Dap Hartmann. 2009. «Why'Open Innovation'is old wine in new bottles». *International Journal of Innovation Management* 13(04):715–36.
- West, Joel, Ammon Salter, Wim Vanhaverbeke, Henry Chesbrough. 2014. «Open Innovation: The next Decade Introduction». *Research Policy* 43(5):805–11.

Additional literature:

- Chesbrough, Henry. 2012. «Open Innovation Where We've Been and Where We're Going». *Research-Technology Management* 55(4):20–27.
- Dahlander, Linus, David M. Gann. 2010. «How Open Is Innovation?». *Research Policy* 39(6):699–709.
- Gassmann, Oliver, Ellen Enkel, Henry Chesbrough. 2010. «The Future of Open Innovation». *R & D Management* 40(3):213–21.
- Mowery, D. C. 2008. «Plus ca Change: Industrial R&D in the „Third Industrial Revolution“.» *Industrial and Corporate Change* 18(1):1–50.
- Remneland Wikhamn, Björn, и Wajda Wikhamn. 2013. «Structuring of the Open Innovation Field». *Journal of technology management & innovation* 8(3):173–85.
- Von Hippel, Eric. 2005. «Democratizing Innovation: The Evolving Phenomenon of User Innovation». *Journal for Betriebswirtschaft* 55(1):63–78.

8. *Ethics, power, and other social drivers of STI*

Can STI exist without interventions from other social institutions? Is it free from ethical and political motives? How different factors influence STI development?

Basic literature:

- Brey, Philip. 2007. “The Technological Construction of Social Power”. *Social Epistemology* 22(1): 71-95.

Jelsma J. 2006. Designing ‘moralized’ products. In *User Behavior and Technology Development*. Springer: 221-231.

Additional literature:

Oudshoorn, Nelly, Ann Rudinow Saetnan, Merete Lie. 2002. «On gender and things: Reflections on an exhibition on gendered artifacts». *Women’s Studies International Forum*, vol. 25. Elsevier: 471–83.

Bogner, Alexander, и Wolfgang Menz. 2010. «How Politics Deals with Expert Dissent: The Case of Ethics Councils». *Science, Technology & Human Values* 35(6):888–914.

Haraway, Donna. 1991. *A Cyborg Manifesto. Science, technology and socialist-feminism in the late twentieth century in Simians, Cyborgs and Women*, Routledge. Chapter 1.

European Commission. 2013. *How Gender Analysis Contributes to Research*. Brussels: Directorate General for Research & Innovation.

van Raan, Anthony. 2005. ‘Fatal Attraction: Conceptual and Methodological Problems in the Ranking of Universities by Bibliometric Methods.’ *Scientometrics*, 62(10): 133-143.

Whitley, Richard & Jochen Glaser (eds.). 2007. *Governance of the Sciences. The Advent of Research Evaluation Systems*. Springer. Chapter 1: 3-30.

6. Grading system

The overall course grade (10-point scale) is calculated as a sum of

$$G = 0.7W + 0.1C + 0.2E$$

The overall course grade G (10-point scale) includes results achieved by students in their written exam (W), colloquium (C) and one essay (E); it is rounded up to an integer number of points.

Summary Table: Correspondence of ten-point to five-point system’s marks

| Ten-point scale [10] | Five-point scale [5] |
|---|----------------------|
| 1 – unsatisfactory 2 – very bad 3 – bad | Unsatisfactory – 2 |
| 4 – satisfactory 5 – quite satisfactory | Satisfactory – 3 |
| 6 – good 7 – very good | Good – 4 |
| 8 – nearly excellent 9 – excellent 10 – brilliant | Excellent – 5 |

7. Course assignments

a. Essay (E)

During the course, students will be asked to write one short essay of around 3000 words developing a particular topic covered by the course. Essay is a piece of written work focused on a suggested or selected topic and considering one particular case of user innovation. Essay should answer the following criteria:

- 1) Aims and objectives – research question, aims and objectives are concisely elaborated. Significance emerges logically from construction of argument and clearly articulated.
- 2) Background and literature review – creative and organised literature review that outlines the background and context for the research project.
- 3) Methodology – creative and appropriate methodology is clearly articulated and justified.
- 4) Presentation – proposal is logical in its construction with minimal spelling, punctuation or grammatical errors. In-text and reference list consistently adhere to a single Author-date system throughout.

Lateness penalties

If there is good reason for not meeting a coursework deadline, a student may request an extension from one of the course organisers (for extensions of up to five working days). Extension requests should normally be made before the deadline. A good reason is illness, or serious personal circumstances, but not pressure of work or poor time management. The course organiser must support the request in writing (email), and extensions over five working days may require supporting evidence. If you think you will need a longer extension, or your reasons are particularly complicated or of a personal nature, you should discuss the matter with the Academic supervisor and Coordinator of your Master's program.

There are formal procedures for requesting an extension and penalties for late submission. The penalty will be a reduction of two marks per working day (i.e. excluding weekends) for up to five days. For work handed in more than five days late a mark of zero will be recorded.

a. Colloquium (C)

During colloquiums, students will discuss problems introduced in the papers included to the essential reading list for each lecture (marked as basic literature). Students are welcome to undertake a broader optional reading that may assist in building up stronger argumentation and help greatly both in writing an essay and in the examinations. Questions for discussion will be sent in advance therefore all participant are expected to get prepared for the seminar.

8. Examination type

During the exam (60 min) students will be asked to write 2 short essays on topics covered by the course. Available topics will be divided into two blocks each consisting of 5-6 topics. Students will have to choose at least one topic from each block. Prior to examinations, all students will be issued with anonymous candidate codes which should be written in the appropriate space on answer booklets during the exam.

9. Methods of instruction

The course combines lectures and seminars through a participatory sessions and group work. Lectures are designed to clarify major theoretical concepts and international experiences employed in regional STI policy studies. Seminars are aimed at sharing the students' reflections on the approaches introduced in the literature and developing analytical and practical abilities required to professionally discuss topics aroused during the course. The students are expected to be ready for discussions using the recommended readings and lecture materials.

10. HSE Library e-resources

HSE Library e-resources: <https://library.hse.ru/en/e-resources>

11. Software Support, including Open-Source Database Software

- Microsoft Windows 7 Professional RUS: internal university network (agreement)
- Microsoft Windows 10: internal university network (agreement)
- Microsoft Windows 8.1 Professional RUS: internal university network (agreement)
- Microsoft Office Professional Plus 2010: internal university network (agreement)
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12. Special Equipment

Classrooms for lectures provide proper use and presentations of particular topics, specifically:

- PC with internet access and office software or laptop
- multimedia projector
- screen
- flipchart