

Course information for the winter term 2023/24

Module: Applied Economic Theory

Course: Innovation economics: understanding transitions towards sustainability

This course consists of two parts. In the first half, students will be introduced to the fundamentals of innovation economics to understand the transitions towards sustainability. In the second part, there will be a deep dive into current topics of transitions. Moreover, approaches and methods for analysing those transitions will be used.

Lecture part:

Students are able to explain essential aspects of innovation economics and to point out the implications of innovation activity for market dynamics. First, they will be able to define the term innovation and point out the different types of innovation. Students will have knowledge of neoclassical/evolutionary models of innovation and growth and will be able to critically contrast them in terms of explaining technological change as well as long-term growth. Furthermore, students are able to explain important concepts of innovation economics and apply them in the context of case studies to analyse diffusion processes, technology cycles, interactions between market participants or (technological) innovation systems. Finally, students will be able to reflect and deal with normative aspects of economics from a Neo-Schumpeterian perspective.

- Intensive examination of theories of innovation economics to explain technological change and growth, innovation processes, fundamentals of neoclassical innovation economics as well as evolutionary and institutional theoretical explanations.
- Application of the concepts of Neo-Schumpeterian innovation economics to concrete use cases in the context of case studies on (technological) innovation systems, market dynamics, innovation processes and technology cycles.
- Discussion and short presentation of case studies in the tutorials.

Seminar part:

Sustainability transitions as research agenda have become more important than ever. While tightened political goals and increasing environmental problems are highlighting the necessity to accelerate sustainability transitions, further external events such as gas shortages in the course of the Russian war in Ukraine have become game changer in the transition process. In order to analyse the current state, challenges and intervention points for policy making, Neo-Schumpeterian innovation economics propose a systemic view on transition and necessary technologies. Systemic in this sense means, that different actors groups contributing to sustainable technologies and transformations are analysed regarding their specific functions,

roles and relations with each other. As a result, the Innovation System approach, notably with a focus on technologies (Technological Innovation Systems, TIS), and the Multi-Level Perspective (MLP) occurred as analytical concepts for research on sustainability transitions. While the TIS approach focuses on the challenges of one technology and related design varieties, the MLP approach is able to not only look at one technology, but the entire interaction of multiple existing and new technologies and socio-technical practices in the course of sustainability transitions.

Recent research on how to accelerate sustainability transitions emphasises the combined consideration of supply-sided and demand-sided challenges, notably in the fields of energy transitions. Promising and mature sustainable technologies still have problems to enter markets for diffusion. Other sustainable technologies, on the contrary, which have already entered the market to a certain degree, still have supply-sided challenges regarding the technological improvements based on R&D or the mobilisation of resources (e.g., the heating pump or electrolysis technologies for hydrogen production). Another supply-sided challenge is the compatibility of technology to an existing or a possible new socio-technical system, for example to a more flexible (“smart”) electric grid or to a future hydrogen-based gas distribution grid. These examples among energy transitions demonstrate, that research on sustainability transitions and sustainable technologies require to consider an integrated analysis of different dimensions including supply-sided and demand-sided challenges as well as other challenges for transitions, including legitimacy or missing system building, system integration, foresight or strategic intelligence activities. As the TIS functional approach and the regime dimensions of MLP are providing a variety of such analytical dimensions in integrated frameworks, this seminar aims presenting both concepts for analysing issues in sustainability transitions.

Dates: See Course catalogue

Acquisition of ECTS / credit points:

The course is assessed with 6 semester hours per week. Students will receive 12 credit points upon successful participation.

Requirement and admission restriction:

No

Application:

Via chair of innovation management:

The course is aimed at students in the Economics and Public Economics master’s program. Interested applicants should apply by 2 pm on 10.10.2023, indicating: (1) first and last name, (2) matriculation number, (3) e-mail address, (4) copy of student ID, (5) certificate of previous grades, and (6) a short note if you are enrolled under the old (WiSe 12/13) or new study regulation (WiSe 22/23).

Applications can be made by email to julia.simper@fu-berlin.de. You will receive a notification about the possibility to participate by 8 pm on 12.10.2023. Incomplete or late applications will not be considered.

The number of participants is limited to 25. If more applications than that are received, a selection will be made by the lecturer.

Examination:

Students are required to write a term paper (length approx. 15 pages) according to scientific standards and present their results (30 min). The seminar grade results from the evaluation of the written term paper and the presentation. The guidelines for the preparation of seminar papers can be requested from the chair. The research paper must be submitted digitally via e-mail as a PDF document by 31.03.2024, 10 am.

Please note that in order to get 12 ECTS points in total, students enrolled under **the old study regulation** have to a) pass an exam that will take place on 11.12.2023 in order to get 6 ECTS for the module "Selected Topics in Microeconomics" and b) write the scientific term paper to get another 6 ECTS for the module "Current Research Topics on Microeconomics".

Language: English

Contact:

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Recommended Literature:

Dosi, G. (1982): Technological paradigms and technological trajectories – A suggested interpretation of the determinants and directions of technical change. *Research Policy*, 11, 147-162.

Fagerberg, J. (2002): A Layman's Guide to Evolutionary Economics (No. 17). Centre for Technology, Innovation and Culture, University of Oslo.

Geels, F. W. (2002): Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study. *Research Policy*, 31, 1257-1274.

Hekkert, M., Negro, S., Heimeriks, G., & Harmsen, R. (2011): Technological innovation system analysis: A manual for analysts. Copernicus Institute for Sustainable Development and Innovation, Utrecht University.

Hekkert, M. P., Suurs, R. A., Negro, S. O., Kuhlmann, S., & Smits, R. E. (2007): Functions of innovation systems: A new approach for analyzing technological change. *Technological forecasting and social change*, 74(4), 413-432.

Nelson, R.R. et al. (2018): *Modern Evolutionary Economics*. Cambridge University Press.

Taylor, M., & Taylor, A. (2012): The technology life cycle: Conceptualization and managerial implications. *International Journal of production economics*, 140(1), 541-553.