

MUO-E8029 - Systems Thinking, 5cr | Syllabus

Time: 27.10.2020-03.12.2020 | Tuesday-Thursday 13.15-16.15 | online at <https://aalto.zoom.us/j/69758735757>

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Course Content:

The course addresses socio-ecological systems and changes in system over time. It introduces theoretical foundations of the large-scale systemic principles and multi-dimensional interdependencies of sustainability. Key notions are derived from complex adaptive systems and transition theories. These concepts and systems thinking are used to analyse design approaches towards circular economy and sustainable living environments and to learn to anticipate unintended consequences of sustainability solutions.

- Lectures including shared lectures with the programme Spatial Planning and Transportation (SPT) at Aalto ENG
- Peer-to-peer teaching
- Readings to support classroom activities, course essay and exercises
- Students write a course essay to expand on the significance of systems thinking

Assessment criteria:

- course essay • other individual assignments • active presence in class/online platforms • peer-to-peer teaching

Workload:

5 ECTS = 135 hours in total

- Lectures (36h) • Essay (25h) • Teamwork (30h) • Literature, individual work (34h) • Personal reflection (10h)

Assignments:

• **Course essay (individual)**

Theme: Implications of systems thinking perspectives in your field of action/profession/practice

Length: 1500-2000 words | Submission deadline: Friday, 18 December

• **Book presentation assignments in groups**

- Plan and run a 20-minute session (presentation + workshop) on selected books
- Submit one-pager on your reading material. First groups on Tuesday 24.11 by 24.00 and the second groups on Friday 27.11. by 24.00.
- Submit presentation materials by 24.00 of the presentation day. Add one slide reflection on how you think your session went.

Schedule of Lectures + Pre-Readings:

Date Lecture theme & pre-readings

Tuesday, 27 October: Introduction; Planetary boundaries; Systems thinking frameworks

Literature: Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., ... & Folke, C. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, 347(6223). Access to PDF [here](#).

Thursday, 29 October: Socio-technical transitions - Transition and innovation studies as system studies

Guest lecturer: Paula Kivimaa, Finnish Environment Institute

Literature: Geels, F. W. (2020). Micro-foundations of the multi-level perspective on socio-technical transitions: Developing a multi-dimensional model of agency through crossovers between social constructivism, evolutionary economics and neo-institutional theory. *Technological Forecasting and Social Change*, 152, 119894. Access article on aalto.finna.fi

Tuesday, 3 November: Core concepts of systems thinking

Guest lecturer: Idil Gaziulusoy, Aalto University Department of Design

Literature: • Meadows, D. H. (2008). *Thinking in systems: A primer*. Chelsea green publishing. Ch2 A Brief Visit to the Systems Zoo. Access PDF [here](#).
• Meadows, D. (1999). *Leverage points - Places to intervene in a system*. Sustainability Institute. Access PDF [here](#).

Thursday, 5 November: Urban metabolism: Water, energy, materials and nutrient flows in the city

Guest lecturers: Alpo Tani, City of Helsinki; Kata Fodor, Aalto University Department of Design

Literature: • Kennedy, C., Cuddihy, J., & Engel-Yan, J. (2007). The changing metabolism of cities. *Journal of industrial ecology*, 11(2), 43-59. PDF [here](#).
• Carbon-Neutral Helsinki 2035. Access PDF [here](#), and read about the city's SDG work [here](#).

Tuesday, 10 November: Systems of production and consumption, rebound effect, economic growth and capitalism as system condition

Guest lecturer: Jukka Heinonen, University of Iceland, Faculty of Civil and Environmental Engineering

Literature: Czepkiewicz, M., Heinonen, J., & Ottelin, J. (2018). Why do urbanites travel more than do others? A review of associations between urban form and long-distance leisure travel. *Environmental Research Letters*, 13(7), 073001. Access to PDF [here](#).

Thursday, 12 November: Regenerative design - partnering with places and nature

Guest lecturers: Katri Einola, Creative Sustainability student, Aalto University Department of Design;

Abigail Garbett, Uppsala University (CEMUS) / UK Urban Ecology Forum

Literature: • Regenesys (2016) Ch2 Understanding place. In: *Regenerative Development and Design: A Framework for Evolving Sustainability*. pp33-60. ([link](#)) Access from aalto.finna.fi
• Watch a video by Daniel Wahl at <https://www.youtube.com/watch?v=qQUqna4ObxQ>
• Additional: Soulé, M. E.: What is conservation biology? ([link](#)) Access from aalto.finna.fi

SPLIT streams / CS schedule:

Tuesday, 17 November: *Dilemma board game on zoom*

Thursday, 19 November: *Systems thinking exercises*
with Idil Gaziulusoy

Tuesday, 24 November: *Reconfiguring the textile industry with systems thinking tools*
with Olli Sahimaa and Liz Miller, Aalto University School of Business. FINIX – sustainable textile systems
project link: <https://finix.aalto.fi>

Thursday, 26 November: *Peer teaching*

Tuesday, 1 December: *Peer teaching*

Thursday, 3 December: *Course summary together with SPT*