

MGT-505

Systems thinking

Nick Sascha

Cursus	Sem.	Type
Managmt, dur et tech	MA2	Obl.

Language of teaching	English
Credits	4
Withdrawal Session	Unauthorized Summer
Semester	Spring
Exam	During the semester
Workload	120h
Weeks	14
Hours	4 weekly
Lecture	3 weekly
Project	1 weekly
Number of positions	40

It is not allowed to withdraw from this subject after the registration deadline.

Summary

MGT-505 Systems Thinking course equips students with the skills to analyze and solve complex problems across domains. The course is hands-on and covers the main systems concepts and tools, applied to multiple real-life problems.

Content

- Introduction to Systems Thinking, Complexity, Wicked Problems
- Systems Archetypes and Dynamics
- Feedback Loops and Causal Loop Diagrams
- Stock and Flow Diagrams
- System Dynamics Modeling
- Leverage Points in Systems
- Mental Models and Learning Organizations
- Complex Adaptive Systems
- Systems Thinking in Public Policy
- Systems Thinking in Business and Management
- Sustainability and Systems Thinking
- Integration and Application

Participants will develop the following transversal skills:

1. Critical Thinking
2. Complex Problem-Solving
3. Effective Teamwork
4. Communicate complex ideas
5. Ethical Reasoning

Keywords

Systems Thinking, Complex Adaptive Systems, Feedback Loops, Causal Loop Diagrams, Stock and Flow Diagrams, System Dynamics, Leverage Points, Mental Models, Learning Organizations, Sustainability

Learning Outcomes

By the end of the course, the student must be able to:

- Explain fundamental concepts and principles of systems thinking.
- Identify and model feedback loops and causal relationships in complex systems.
- Construct and analyze stock and flow diagrams to understand system behavior.
- Identify leverage points for effective intervention in systems.
- Apply systems thinking to address real-world problems in various domains.
- Assess / Evaluate and challenge mental models and their impact on decision-making.

Teaching methods

1.
Lectures: flipped classroom with preparatory readings
2.
Case Studies
3.
Hands-on Workshops
4.
Group Discussions
5.
Project-Based Learning

Expected student activities

1.
Reading assignments for each class
2.
Class participation
3.
Weekly assignments
4.
Midterm project: develop a systems model and analysis of a selected problem.
5.
Final project: design and present a systems solution to a complex problem

Assessment methods

30% Weekly assignments: reading, writing, presenting or discussing in class

30% Midterm project: relevance and insightfulness of the systems model and analysis.

40% Final project and presentation: validity, creativity, and effectiveness of the proposed solution, as well as the quality of the presentation.

Supervision

Office hours	No
Assistants	Yes
Forum	Yes

Resources

Virtual desktop infrastructure (VDI)

No

Bibliography

- Meadows, D.H., 2008. Thinking in systems: A primer. Chelsea Green Publishing.
- Senge, P.M., 2006. The fifth discipline: The art and practice of the learning organization. Broadway Business.

Ressources en bibliothèque

- [Thinking in systems / Meadows](#)
- [The fifth discipline / Senge](#)

Moodle Link

- <https://go.epfl.ch/MGT-505>