Methods for Sustainable Development Practice: A Systems Approach (INDEV 607)

Course Outline (Winter 2021)

Instructor: Dr. Simron Jit Singh, Professor, SEED
Office hours: By appointment
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Times and location

This course is taught online and asynchronous. Student groups will be formed at the start of the course, and groups will have the option to interact with the instructor informally by appointment.

Course Description

In this course, we will learn to frame and seek solutions to development and sustainability problems using system thinking. 'Systems thinking' has been defined as an approach to problem solving, by viewing problems as parts of an overall system. Peter Senge calls systems thinking a "discipline for seeing wholes". In INDEV 607, students will learn key system concepts and apply them to real-world cases for problem solving. It teaches you to get to the root of the problem and seek solutions accordingly, rather than simply remedying the symptoms. A linear thinker, for example, will ask: "How can we get rid of poverty?". A systems thinker will instead probe deeper into: "Why does poverty exist?". By framing the question differently, a systems thinker aims to address the root of the problem.

By the end of this course, students will be able to apply system concepts and tools to a problem, seek solutions, visualize through maps, articulate to an outside audience, and work collaboratively as a team. The first part of the course will introduce students to system concepts and tools, along with activities applying these to real-world examples. The second part of the course will prepare students to take part in the 2021 "Map the System" (MTS), a global competition that challenges you to think differently about social and environmental change. The University of Waterloo is an institutional partner of MTS, and this introductory video provides an excellent overview of the challenge. INDEV 607 is one of the five courses at UW that embeds MTS as part of the course design.

The development of any skill requires practice. The course is interspersed with weekly activities that prompts students to apply learnt concepts and tools to real cases. It is encouraged that you regularly attempt these exercises, and make use of the resources made available to you. This will prepare you to attempt more complex cases over time, and ensure an appropriate level of learning outcome.

Key books

Meadows, D (2008). *Thinking in Systems*. Chelsea Green. (available as e-book from the UW library and course reserve)

Johnson, A., Papi-Thornton, D., Stauch, J. (2019). *Student Guide to Mapping a System*. University of Oxford [official guide to MTS challenge]. https://www.mtroyal.ca/nonprofit/InstituteforCommunityProsperity/_pdfs/ssdata_icp_mts_2020.pdf

If you encounter problems in accessing the readings, please contact our liaison librarian, Agnes Zientarska-Kayko: azientarskakayko@uwaterloo.ca

Note: *Narrated PowerPoints, podcasts, brief articles, activity sheets, and other resources will be uploaded to LEARN on Mondays.*

Overview of graded assignments

Deliverable	Topic	Due Date	Where/how?	Marks
Milestone 1	Team charter - Topic, registration -	25 January 2 February	Dropbox; MTS website	5
Activity 1	What is a System? Quiz and worksheet	29 January	Quiz on LEARN & Discussion forum	5
Activity 2	What gives rise to systems? Worksheet	7 February	Discussion forum	5
Milestone 2	Research (annotated bibliography on MTS topic)	12 February	Dropbox	10
Activity 3	Applying systems tools to a case study	25 February	Bongo video assignment (BVA)	20
Milestone 3	Analysis of your MTS topic	12 March	Dropbox	15
Milestone 4	Submit your draft pitch for peer review (visual map)	23 March	Bongo Video Assignment (BVA)	5
Milestone 5	Peer review of 2 other group-projects	28 March	Inside the BVA	5
Milestone 6	Submission of final project (pitch + 3 items for MTS)	2 April	BVA, Dropbox, MTS website	20
Milestone 7	Self-and-peer evaluation of group process, and division of marks (see pg. 6)	9 April	Dropbox	10

Milestones are the various steps to accomplish the major class project, that is the Map the System (MTS) competition (60 marks). Activities are for learning system concepts and tools (30 marks). And 10 marks are assigned for effective group collaboration.

Weekly schedule of topics

Unit 1: January 11th – 15th

Introduction to the course content, structure, standards, expectations, deliverables, readings.

Introducing "Map the System" (MTS) challenge

Creating student teams/groups: For the instructor to form teams/groups, please fill out a 3-question survey on LEARN (closes on 14 January 2020). The same groups/teams will collaborate on all *Activities* and *Milestones* as in the Table above.

Unit 2: January 18th – 22nd

What is Systems Thinking?

- Why use a systems practice?
- Systems thinking as a tool for problem solving

Milestone 1: Group contract/team charter (due 25 Jan), and topic for MTS (due 2 February) on LEARN-Dropbox. What is a group contract, and how to write one? You will be provided with some resources/templates to assist with this task (5 marks).

*Waterloo will host **Team Mixer** from **3-4 PM EST on Wed, Jan 27**. This will provide an opportunity to meet other competitors, forge connections, exchange ideas, and get excited about systems thinking! Should you be interested please find the registration page **here**.*

Unit 3: January 25th – 29th

What is a System?

- Systems and sub-systems (parts, wholes and relationships)
- Characteristics of a system
- Quiz on LEARN "what is a system"?
- Introducing Activity 1 (what is a system), due 29 January (5 marks)

Unit 4: February 1st – 5th

What gives rise to systems?

- Relationship between structure and behavior
- The Iceberg Model
- Behavior over time Graph (BOTG) using the bathtub example
- Delays and lags in a system
- Introducing Activity 2, due 7 February (10 marks)

Deadline for MTS teams to register online with proposed topics: 7 February 2021
You are encouraged to discuss your topic with the instructor prior to registration. The registration will take roughly 15 minutes to complete. You will be asked to provide the name(s) and contact information of all team members and a short overview of the topic you wish to research. Link to UWaterloo's Map the System homepage

Unit 5: February 8th – 12th

How the system runs itself?

- What are feedback loops?
- Reinforcing and Balancing loops
- Introducing Causal Loop Diagrams (CLDs)
- Introducing Activity 3, due 25 February (20 marks)

Milestone 2: Research in the form of annotated bibliography on MTS topic, due 12 Feb. Note: This bibliography will form the basis of component 3 of MTS final submission (detailed bibliography). See submission guidelines here: https://www.mapthesystem.ca/submission-guidelines

Reading week

Unit 6: February 22nd – 26th

Fine tuning your Causal Loop Diagrams (CLDs)

- Causal Loop Diagrams (CLDs)
- Common system archetypes

Activity 3: Due 25 Feb. (20 marks).

Unit 7: March 1st – 5th

The role of "perspective" in systems thinking (or mental models)

- Participation in development practice
- Participatory tools in space / time representation

Unit 8: March 8th – 12th

Map the System - Analysis

No new material will be posted. Students work towards their MTS case analysis of 2,500 - 3,000 words (Milestone 3, due 12 March) outlining your understanding of the problem or challenge at hand (problem landscape), what solutions are currently available (solutions landscape), where are the gaps, and what might be levers of change?

Note: This analysis will form the basis of component 2 of MTS submission (written summary of research). See submission guidelines here: https://www.mapthesystem.ca/submission-guidelines

Unit 9: March 15 – 19th (no classes on 15-16 March)

No new material will be posted. Students work towards their final MTS package for peer review (see below). Final package consists of 3 components: visual systems map, written summary of research, detailed bibliography.

See submission guidelines here: https://www.mapthesystem.ca/submission-guidelines

Unit 10: March 22nd – 26th

Groups submit their project pitch for peer review (Milestone 4, due 23 March): Project pitch will be a Bongo video assignment) that will be peer-reviewed by 2 other groups. Peer review is aimed to provide constructive feedback prior to final submission to MTS portal the following week. Conducting a peer review will also contribute to your own learning and self-reflection by identifying areas for improvements for others, by raising questions, critique the analysis or solutions of others, etc.

Unit 11: March 29th – April 2nd

Groups complete peer-review and return comments (Milestone 5, due 28 March). Groups review and incorporate feedback as appropriate and submit all materials to LEARN, and to the MTS online system for the campus finals (Milestone 6, due 2 April).

Participating in the UW finals in April is optional and outside this course, but since you have worked hard on your project and submitted it to MTS, I encourage you to participate. There are **three prizes** for UW campus finalists, including:

- **$2,000 for 1st place**, sponsored by Kindred Credit Union.
- **$1,000 for 2nd place**, sponsored by the Waterloo Council for Responsible Innovation.
- **$500 for 3rd place**, sponsored by the Waterloo Institute for Complexity and Innovation.

Unit 12: April 5th – 9th

- **Evaluation of group process** (self-and-peer-review), and (re)distribution of the pool of marks (see below) (Milestone 7, due 9 April).

- **Course feedback** (informal) and **course evaluation** (formal)

Evaluation

For a graduate level course, I lay emphasis on critical thinking and integration of course material in all the products. I aim to look at the cumulative outcome of your piece of work. Does the whole stand out as a strong piece of work? Were there some outstanding aspects that should receive additional weighting and be taken into account? In trying out the methods in this course, I look not only at outcomes, but also the process and efforts to learn and try out novel ideas. It's more about what you have learnt with hands on experience, rather than the outcome alone.

Group process marks (or making invisible work visible): All assignments (activities and milestones) in this course are worked upon as a group. Collaboration is key to solving complex societal and environmental problems and is one of the learning objectives. However, group efforts and process remain largely invisible to the instructor but must be compensated for. It is also important to ensure that each group member contributes equally as agreed in the team charter/group contract that will be prepared and submitted early on in the course. Groups are encouraged to review their progress and collaboration as a team at least twice during the course, and adjust team charter if necessary, with the consent of the instructor. In the last unit of the course, groups will be asked to conduct a self-and-peer evaluation of the collaboration throughout the course – template will be provided (Milestone 7, due 9 April). Group members will then determine a pool of 30 marks in a consensus based on the contributions of each member (see one example below). Group members should maintain a log of work done individually. Should there be disagreements and lack of consensus, the instructor will intervene and review all the material.

Example for distribution of a pool of marks

- Individual mark for group collaboration in this course: 10
- Number of group members: 3
- Total pool of marks to the group: 30 marks (10 marks x 3 members)
- Group members divide marks by consensus as follows:

Names of group members	*Ann*	*Bob*	*Chris*	*Total*
Marks assigned	*12*	*10*	*8*	*= 30*

In the example above, the group assessed that Ann exceeded the expectations with her contribution, while Bob met the expectations, and Chris fell below expectations. Hence, 2 marks from Chris were given to Ann. Once the group reports the distribution of marks to the instructor, the instructor can either take the mark as they have been divided up to add to the individual total, or use them as a ratio, depending on how the totals look like.

Course policies

LEARN: For this course, we will use LEARN - a web-based teaching and interacting tool that has a number of features. All course materials will be posted on LEARN, and assignments will be submitted to LEARN.

Electronic communication policy: I will only be using your UW email account to communicate to you, especially when sending group mails via LEARN. So please remember to check your UW account frequently, or set up a forwarding system to an account you use most. You will not be automatically notified for new announcements. If you wish to be notified, you will need to activate this function on LEARN – see instructions here. However, in case of individual queries, I will respond (within 3 working days) by using the reply function to the email id you are writing from. I will not respond to any requests or messages sent via Facebook, SMS, or other social media.

Unclaimed assignments will be retained for two months after term grades become official in quest. After that time, they will be destroyed in compliance with UW's confidential shredding procedures.

University Policies and Support

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check the Office of Academic Integrity for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4. When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check the Office of Academic Integrity for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline. For typical penalties, check Guidelines for the Assessment of Penalties.

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals.

Note for students with disabilities: AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.

Intellectual Property. Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo. Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

Coronavirus Information

Coronavirus Information for Students

This resource provides updated information on COVID-19 and guidance for accommodations due to COVID-19.

Mental Health Support

All of us need a support system. We encourage you to seek out mental health supports and resources when they are needed. You can reach out to Campus Wellness and learn about the variety of services available to promote your mental health and wellbeing.