

**IDN 571 Systems and Systems Theory in Design**  
**An introduction to ways to define, frame and understand systems—for the purpose of changing them**

**Format: Seminar | Credits: 1.5 | Core: Systems Thinking |**  
**Faculty: Weslynn Ashton & Cheryl Dahle**

**Course Overview**

Systems thinking describes a way of seeing the world in which systems are constructs that have defined goals, clear boundaries, rules and interacting parts. Systems range from simple to complicated, complex and adaptive. This course introduces students to different types of social, ecological and technological systems in which humans are embedded. Through the course, they will learn how to utilize various systems thinking tools to identify commonly observed problems and patterns; explore systems goals, rules, power dynamics, functions and dysfunctions; identify leverage points; and design for achieving systems change. They will develop a greater understanding of how systems shape their own lives and personal experiences. Students will form small teams and choose a focal system, for which they will map the system interactions, identify key power dynamics, and offer new opportunity areas to explore.

**Learning Objectives**

Students completing this course will be able to:

- Define systems theory, key systems thinking concepts and their relationships, and different types of systems
- Illustrate different ways of modeling and mapping systems
- Identify goals, power dynamics, root causes of dysfunction, and leverage points in systems
- Formulate design interventions for driving systems change

**Required Books**

- Emergent Strategy by adrienne maree brown [free e-book available through [IIT Library](#), ~\$12 softcover, \$12 e-book on Amazon]
- Thinking In Systems: A Primer by Donella Meadows [print book available through [IIT Library](#), ~\$17 softcover, \$15 e-book on Amazon]

**Project**

Small teams (2-3 students) will focus on different system problems (e.g., urban food access, covid-19 outbreak and response, juvenile justice reform, education), for which they will map the important variables and resource flows, identify system dynamics and archetypes, uncover key power relationships and leverage points, and offer new opportunity areas to explore.

## Schedule Overview

Class meeting date (Thurs)	Topics	In class activity	Assignment due (following Wed 11:59pm)
January 20th	Course Overview; Intro to Systems	Personal values, worldviews and biases	Individual assignment: Personal values, worldviews and biases
January 27th	Family systems; Trauma informed design	<i>Guest Speaker</i>	Individual assignment: Redesign X (product, service, place) from a trauma informed lens
February 3rd	Systems thinking tools; Archetypes	Identifying systems variables, boundaries and mapping	Team project: systems map (key variables and their connections)
February 10th	Power dynamics; Systems of oppression	Mapping power dynamics	Team project: power dynamics map (stakeholders, influence, history)
February 17th	RecruitID - no class		
February 24th	Social and economic systems:	Systems leverage points and interventions	Team project: leverage points and interventions
March 3rd	Socio-Ecological-Technical Systems	Fishbanks Simulation	Individual assignment: Reflection on Fishbanks
<i>March 8th</i>	How designers apply systems thinking	Poster presentations <i>Guest Speakers</i>	Team project: Final report and poster presentation (in class)

## Detailed Course Schedule

### Week 1: Course overview

Human systems are shaped by those who establish the rules and structures that govern them, and as such are shaped by the values and perspectives of those individuals. In addition, how we view and understand systems is shaped by who we are, our values and how we see the world. A failure to understand our positionality, biases and differences creates blind spots that can cause harm, interpersonally as well as systemically.

#### 1. Readings (2 hours):

Required:

- brown – intro, pp 1-39
- Meadows – Intro, Ch 1, pp 1-34

Optional:

- LeBaron. [Cultural and Worldview Frames | Beyond Intractability](#)
- [Indigenous Worldviews — Our Laws Arise from the Land](#)

#### 2. Multimedia (1 hour):

Videos:

- Systems Thinking: A Little Film About a Big Idea, Cabrera Research Lab.  
<https://www.youtube.com/watch?v=-sfiReUu3o0>
- Design for Worldview, Emi Kolawole & Amy Lazarus, TEDxDirigo.  
<https://www.youtube.com/watch?v=WyKbMIv4PJY>
- *Optional Interview with Tyson Yunkaporta, ABC News Australia.*  
<https://www.abc.net.au/news/2020-03-05/how-indigenous-thinking-can-save-the-world/12024218?nw=0>

#### 3. Synchronous Meeting (Jan 20, 3 hours): Course Overview, Worldviews & Systems Thinking Core Concepts

- What are your core values and worldviews? How do they affect how you see the world around you? What biases do they present in how you approach your work as a designer?

#### 4. Assignment (2 hours) by Wednesday 26 January 11:59PM on Blackboard:

- Submit an individual written reflection on your personal values, worldviews and biases. What are your core values and worldviews? How do they affect how you see the world around you? What biases do they present in how you approach your work as a designer? (~500 words).

## **Week 2 - Family systems**

Systems thinking in the field of psychology maps the intricacies of family relationships as well as an individual's context within multiple system layers. We'll explore how the ideas of multiple intersecting "constraints" for individuals affect how you think about the link between systems design, human centered design, and behavioral design.

### **1. Readings (2 hours):**

- Read excerpt [What Happened To You](#), pps 21-41
- [Read "Designing for Healing, Dignity & Joy,"](#) a research paper from Shopworks Architecture in Denver, Colorado

### **2. Multimedia (1 hour):**

- [How Childhood Trauma Affects Health Across a Lifetime](#), Dr. Nadine Burke Harris

### **3. Synchronous Meeting (January 27 (in person), 3 hours):**

- What does it mean to live in "nested" systems? How do the ideas present in family systems theory broaden the concept of human centered design?

### **4. Assignment (2 hours) by Wednesday 2 February 11:59PM on Blackboard:**

- Redesign X (product, service, place) using a trauma-informed lens. Use the core values and key concepts on page 7 of the Shopworks Architecture research paper for reference.

## **Week 3: Systems Thinking Tools**

The systems thinking toolbox consists of a variety of tools that enable us to see the patterns of behavior among variables within a system, some common tools include causal loop diagrams, behavior over time graphs and iceberg diagrams. Stories or archetypes describe commonly observed patterns of function and dysfunction in systems. In this session we will begin mapping systems with these tools.

### **1. Readings (2 hours):**

- brown - principles, elements, pp 41-50
- Meadows – Ch 2, pp 35-85
- Sterman: <https://thesystemsthinker.com/fine-tuning-your-causal-loop-diagrams-part-i/>

### **2. Multimedia (1 hour):**

- In A World of Systems, Donella Meadows  
[https://www.youtube.com/watch?v=A\\_BtS008J0k](https://www.youtube.com/watch?v=A_BtS008J0k)
- All models are wrong, Martin Hillbert.  
<https://www.youtube.com/watch?v=IgAWk5NVfpo>

### 3. Synchronous Meeting (February 3 (in person), 3 hours):

- Consider some problems you routinely encounter (e.g. failing to keep your new year's resolutions, gentrification of neighborhoods) - what are key variables that drive observed behavior in these systems, how are the variables connected, are there any archetypes that match the observed patterns?
- **Submit team preferences**

### 4. Assignment (2 hours) by Wednesday 9 February 11:59PM on Blackboard:

- **Team project: systems map (key variables and their connections)**
- For your assigned focal system: identify key system features (variables, boundaries interactions, feedbacks), discuss what about this system interests you, and what questions you have about how it works and the problems that are encompassed. Crystallize statement on the focal system and questions to be investigated.

## Week 4: Systems of Oppression

While many think of racism, sexism, or ableism as phenomena primarily expressed by one person's individual behavior, these are all systems of thinking (and doing) that drive institutions, legal frameworks, and widespread social norms. We'll explore how these systems exist as coherent and intentional patterns, as well as how they live as unintentional and unconscious bias.

### 1. Readings (2 hours):

- Excerpt: How to Be An Antiracist, by Ibram X. Kendi
- Excerpt: Invisible Women: Data Bias In a World Designed for Men, by Caroline Criado Perez
- brown – interdependence and decentralization pp 83-102, resilience pp 123-150
- Birney, Anna. 2021. "Power dynamics: a systemic inquiry."  
<https://networkweaver.com/power-dynamics-a-systemic-inquiry/>

### 2. Multimedia (1 hour):

- Emergent Strategies for Environmental Justice with adrienne maree brown. United Church of Christ. <https://www.youtube.com/watch?v=PUQWo33geYk>

### 3. Synchronous Meeting (10 February, 3 hours):

- How do you think these systems of oppression have affected how objects, services or whole systems are designed? How should designers take these systems into account in their work? What would you personally need to feel equipped to address these lenses into your work? What do you think of the new terminology of "antiracist" or "anti-sexist"?
- **Share out from assignment**

#### **4. Assignment (2 hours) by Wednesday 23 February 11:59PM on Blackboard:**

- **Team project: power dynamics map (stakeholders, influence, history)**
- Identify what are the power dynamics in the system, who has power, how is it concentrated, how did it become this way, what systems structures enable and perpetuate it? How have those without power in this system navigated these dynamics? How might these positions be strengthened?

#### **Week 5: Social and Economic Systems**

All systems have “rules” that govern how they operate. Those are nothing more than collections of habit, legacy technology and ideas, and values. While we often operate as those the rules of a system are immutable or intrinsic, all human systems are invented. We made them up, which means we can make up something different. We’ll explore how new ideas that disrupt existing rules (like Circular Economies and the Doughnut Economy) can become seeds of change.

#### **1. Readings (2 hours):**

- Nogueira, A., W.S. Ashton, and C. Teixeira. 2019. “Expanding perceptions of the circular economy through design: eight capitals as innovation lenses.” Resources, Conservation and Recycling. DOI: [10.1016/j.resconrec.2019.06.021](https://doi.org/10.1016/j.resconrec.2019.06.021)
- Meadows Ch 6 – Leverage Points - pp 145-165
- brown – nonlinear and iterative, p 103-122

#### **2. Multimedia (1 hour):**

- Ellen MacArthur Foundation. [Circular Economy](#).
- Kate Raworth. [Doughnut Economy](#) TED talk OR [Freakonomics Radio podcast: Episode 429- Is Economic growth the wrong goal?](#)

#### **3. Synchronous Meeting (24 February, 3 hours):**

- Mapping and planning intervention strategies, team systems work
- Pay attention to point that Raworth makes in her speech with the traditional “map” of the economy, and her new one. What are some of the reasons that key aspects in her map were left out from the traditional ones? How does that fit into what you understand about Systems Theory? Based on reading the Blueprint for Grassroots Organizations, what thoughts do you have about which players need to be at the table to create systemic change?
- **Share out from assignment**

#### **4. Assignment (2 hours) by Wednesday 2 March 11:59PM on Blackboard:**

- **Team project: leverage points and interventions**

- Where are the opportunities for making systems change in the focal system? Which ones are critical leverage points?

## **Week 6: Social, Ecological and Technological Systems**

Social, Ecological and Technological Systems (SETs) describe the complex systems combining human-nature and human-technical interactions. From their earliest appearance on Earth, humans have attempted to shape natural systems in their interest, often with both desired and unexpected consequences, including detrimental effects on other species. Our technological progress now enables us to shape and impact these systems well beyond their natural patterns. We will explore how humans can effectively manage natural systems, balancing the needs of human and other species.

### **1. Readings (2 hours):**

- brown - intentional adaptation 67-82
- Ostrom, Elinor. 2009. A General Framework for Analyzing Sustainability of Social-Ecological Systems. *Science*. 325 (5939), 419-422.  
<https://science.sciencemag.org/content/325/5939/419.full>
- Schell, Christopher et al. 2020. The ecological and evolutionary consequences of systemic racism in urban environments. *Science*.  
<https://science.sciencemag.org/content/early/2020/08/12/science.aay4497>
- [Designing for Transitions: Addressing the Problem of Global Overfishing](#), Dahle

### **2. Multimedia (1 hour):**

- [Biomimicry | Janine Benyus - YouTube](#)

### **3. Synchronous Meeting (3 March, 3 hours):**

- Fishbanks Simulation
- **Share out from assignment**

### **4. Assignment (2 hours) by Wednesday 11 March 11:59PM on Blackboard:**

- Fishbanks debrief, incorporating lessons from readings

## **Week 7: How designers apply systems thinking**

### **1. Readings (2 hours):**

- [How the cash bail system endangers the health of Black Americans](#)
- Get familiar with the site and work of [The Prosecutors Alliance of California](#).
- [Read about Design Equity and the Work of these organizations.](#)

**2. Multimedia (1 hour):**

- Watch [Kevin Dedner of Hurdle Health](#)

**3. Synchronous Meeting (8 March, 3 hours):**

- **Presentations and Review - Teams share poster of their systems work**
- The first half of class will be devoted to your presentations.
- The second half will be a panel of practitioners who use system design for social change in their work.
  - [Mary Foydor](#)
  - [Cristine DeSoto Berry](#)
  - [Julius Tapper](#)

**4. Assignment (2 hours) by Friday 11 March 11:59PM on Blackboard:**

**Team project: Final report**