ES26: Humanity and Its Challenges: Systems Thinking Approaches

Spring 2020 | Pierce F100
Mondays
9:00-11:45am

Course Description

As citizens in a rapidly changing world facing increasingly complex challenges, the skills that tomorrow's leaders need are increasingly crossing disciplinary silos. Humanity's most pressing problems are interconnected, involve competing interests, and defy simplification into single disciplines. Reductionist approaches focused on linear understanding must be balanced against the integrative logic of systems-oriented thinking. Depth must be balanced with breadth.

This course will give students an appreciation for the complexities of some of today's most intractable problems, and in so doing, help students develop methodologies for navigating the world they will face. After an overview of systems thinking and its emphasis on interconnections and feedback loops, the course will explore several complex issues. Students will develop a conceptual appreciation of systems mapping and modeling, and over the course of the semester, topics including epidemics, inequality, human displacement, and food systems will be addressed.

Students will learn to employ systems thinking using a multi-disciplinary method to evaluate possible solutions. This future-oriented analysis will emphasize the necessity to zoom out and paint a mosaic of possible unintended consequences and roadblocks that may impede progress. By the end of the course, students should have developed a robust framework for integrating economic, political, technical, ethical, and social lenses into an analysis of complex problems and their potential solutions.

The course is not a lecture and will instead be run as a discussion seminar. It will employ multiple learning methods varying from reviewing academic papers, discussing and debating materials with peers, reading novels and watching videos. **The course is designed to be accessible to all concentrations without significant mathematical preparations**. Each case will include an overview of the issue, before exploring existing disciplinary approaches to address the challenge.

Learning Outcomes

· Think in systems level and understand different systems models and their limitations

· Analyze systems with mapping methods that express linkages and feedback loops
· Learn about complexity – be able to articulate origins and possible mitigations
· Ability to apply frameworks presented in the class to a particular human challenge

Requirements & Evaluation Criteria

· 20% Participation (Coming prepared to class each week engaged and ready to contribute)
· 20% Assignments (Weekly written reflections on readings and any group work)
· 20% Midterm (outline, abstract, bibliography)
· 40% Final Paper (10-15 pages) and Presentation (5 minutes)

Teaching Faculty

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Teaching Fellow

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Collaboration Policy

Discussion and exchange of ideas are essential to this academic work. For assignments in this course, you are encouraged to consult and collaborate with your classmates on the choice of paper topics and to share sources. You may find it useful to discuss your chosen topic with your peers, particularly if you are working on the same topic as a classmate. However, you should ensure that any written work you submit for evaluation is the result of your own research and writing and that it reflects your own approach to the topic. You must also adhere to standard citation practices in this discipline and properly cite any books, articles, websites, lectures, etc. that have helped you with your work. If you received any help with your writing (feedback on drafts, etc.), you must also acknowledge this assistance.

Course Overview

The course will be structured into three parts:

Part 1: An Overview of Systems Thinking, Systems Mapping

Part 2: Case Studies of Challenges Facing Humanity

Part 3: Navigating Uncertainty: Thinking in Action

PART I. SYSTEMS THINKING

Jan. 27 - Week 1 – Introductions, Overview

Course overview, including a detailed discussion of the syllabus and course expectations.

Instructor (and student) introductions; Video: *The Age of Consequences*

Feb. 3 - Week 2 - Introduction to Systems Thinking

Preparation:

Meadows, Donella. *Thinking In Systems: A Primer*. Chelsea Green, 2008.

Assignment:

In 200 words, give an example where a reductionist approach missed a key dynamic that a big-picture, "whole-focused" approach would have identified.

Suggested:

Christakis, Nicholas and James Fowler. *Connected: The Surprising Power of Our Social Networks and How They Shape Our Lives. 2011. Chapter 9.*

Perony, Nicolas. "Puppies! Now That I've Got Your Attention, Complexity Theory." Nicolas Perony: Puppies! Now That I've Got Your Attention, Complexity Theory | TED Talk, Oct. 2013

Feb. 10 - Week 3 - Systems Archetypes and Mapping

Preparation:

Senge, Peter. *The Fifth Discipline: The Art and Practice of the Learning. Organization*. Doubleday, 1990. Appendix 1 & 2.

Feb. 17 – Week 4 – Presidents Day – NO CLASS – Work on Systems Interventions and Leverage Points

Preparation:

Sandel, Michael J. What Money Can't Buy: The Moral Limits of Markets. 1st ed. New York: Farrar, Straus and Giroux, 2012. *Selections.*

Suggested:

Stroh, David. *Systems Thinking For Social Change: A Practical Guide to Solving Complex*
Problems, Avoiding Unintended Consequences, and Achieving Lasting

Results. Chelsea Green, 2015. Part 3.

Assignment Due February 16th by 5pm:

In 200 words, discuss the ethics of a recent policy change (federal, state, or local) and how it impacted the system which is targeted.

PART II. CASE STUDIES

Feb. 24 - Week 5 - Refugees

Preparation:

Millband, David. *RESCUE: Refugees and the Political Crisis of Our Time*. Simon & Schuster, 2017.

Rawls, John. *A Theory of Justice*. 1999. Selections.

Butler, Declan. "Refugees in Focus: The Biggest Concentrations of Displaced People Lie Far from the Spotlight." Human Migration, Special Issue. *Nature*. March 2017.

Motlagh, Jason. "Through the World's Most Dangerous Jungle." *Outside Online*. 2016.

"Special Report: Migration." *The Economist*. November 11, 2019.

Movie: *The Day After Tomorrow* (2004); *Human Flow* (2017)

Assignment:

In 200 words, imagine you are a refugee—fleeing from war, disease, or famine. How would you want other countries to treat you? What would you be doing, hoping for, seeking, recognizing that 100,000s of others are in a similar fate?

Mar. 2 - Week 6 – Pandemics (Guest lecture 9:00 -9:40 am- Juliette Kayyem)

Preparation:

Olival, Kevin J., Hosseini, Parviez R., Zambrana-Torrelio, Carlos, Ross, Noam, Bogich, Tiffany L., and Daszak, Peter. "Host and Viral Traits Predict Zoonotic Spillover from Mammals." *Nature* 546.

Diamond, Jared. *Guns, Germs, and Steel: The Fates of Human Societies*. W.W. Norton, 1997. Chapter 11.

Yong, Ed. "The Next Plague is Coming. Is America Ready?" *The Atlantic*. July/August 2018.

Movie: *Contagion* (2011)

Suggested:

Kean, Sam. "On the Trail of Yellow Fever." *Science* 357, no. 6352 (2017): 637-41.

Preston, Richard. “The Ebola Wars.” *New Yorker*. October 27, 2014.

Quamenn, David. “Where Will the Next Pandemic Come From? And How Can We Stop It?” *Popular Science*. October 15, 2012.

Assignment:

In 200 words, imagine you were in Freetown, Sierra Leone 2014 when the Ebola crisis began and the government had closed all travel routes out; how would you respond?

Mar. 9 - Week 7- Global Food Systems

Preparation:

Singer, Peter. “Famine, Affluence, and Morality.” *Philosophy & Public Affairs* 1(2): 229-43. 1972.

Shapiro, Paul. “Clean meat: how growing meat without animals will revolutionize dinner and the world”. *Simon and Schuster*, 2018.

Movie: *Last Call at the Oasis; David vs. Monsanto; Vanishing of the Bees; Fed Up*

Optional: Dirt!; Fillet oh Fish; Food, Inc; Eating Animals

Assignment:

In 200 words, write about how your personal food selections affect the global food system.

****Mar. 13 - PROJECT MIDTERM PROPOSALS DUE FRIDAY 5pm****

Mar. 16 - Mar. 22 - Spring Recess - NO CLASS

Mar. 23 - Week 8 – Energy & Climate Change (Guest Lecture- Mike Gallagher)

Preparation:

Yergin, Daniel. *The Quest: Energy, Security and the Remaking of the Modern World*. Penguin, 2011. *Selections from Introduction, Part 1, 2, 3, and 4.*

Meyer, Robinson. “Are We Living Through Climate Change’s Worst Case Scenario?” *The Atlantic*. January 15, 2019.

Epstein, Alex. *The Moral Case for Fossil Fuels*. Portfolio, 2014. Ch 3, 4, 6, 7

Koepp, David. *Cold Storage*. Ecco, 2019.

Bryce, Robert. *Power Hungry: The Myths of*"" *Green*"" *Energy and the Real Fuels of the Future*. PublicAffairs, 2011.

Suggested:

Movie: Gore, Al et al. *An Inconvenient Truth*. Rodale, 2006.

Movie: Gore, Al et al. *An Inconvenient Sequel: Truth to Power*. Rodale, 2017.

Assignment:

In 100 words, articulate the case for limiting fossil fuels; do the same, also in 100 words, defending their unrestricted use.

March 30 - Week 9 – Inequality

Preparation:

Putnam, Robert. *Our Kids: The American Dream in Crisis*. Simon & Schuster, 2015. *Selections*.

Young, Michael. *The Rise of the Meritocracy*. Transaction Publishers, 1958.

Stiglitz, Joseph. "The American Economy Is Rigged." *Scientific American*. November 1, 2018

LaPore, Jill. "For Richer or Poorer: Accounting for Inequality." *The New Yorker*. March 16, 2015.

Boushey, Heather, DeLong, Bradford; et al. *After Piketty: The Agenda for Economics and Inequality*. Harvard University, 2017. *Introduction*.

Muller, Jerry. "Capitalism & Inequality" *Foreign Affairs*. March/April 2013.

Movie: *Never Let Me Go* (2010)

Assignment:

Understanding that perfect equality of opportunity and perfect equality of outcomes produce very different extremes, articulate in 200 words how you might seek to balance these two alternate visions of equality.

April 6 - Week 10 – Technology & Humanity

Preparation:

Leonhard, Gerd. *Technology & Humanity: The Coming Clash Between Man and Machine*. Fast Future Publishing, 2016.

Tegmark, Max. *Life 3.0: Being Human in the Age of Artificial Intelligence*. Knopf, 2017. *Chapter 1.*

Thompson, Derek. "A World Without Work." *The Atlantic*. July-August 2015.

Ford, Martin. *Rise of the Robots*. Basic Books, 2016. *Ch. 8-10.*

Colvin, Geoff. *Humans are Underrated*. Portfolio, 2015. *Ch. 1-2.*

Movie: *Ex Machina* (2014).

Assignment:

Speak with someone 30 or more years older than you are about the evolution of technology over their lives, and then articulate in 200 words how you think technology may impact your life over the next 30 years.

PART III. NAVIGATING UNCERTAINTY

April 13 - Week 11 – Systems Thinking Through Scenarios

Preparation:

Mansharamani, Vikram. "Navigating Uncertainty: Thinking in Futures." Essay published in Shroeter, John (editor) *AfterShock*. Technica Press, 2020.

Schwartz, Peter. *The Art of the Long View: Planning for the Future in An Uncertain World*. New York: Currency Doubleday, 1996. *Chapter 1.*

Wack, Pierre. "Scenarios: Shooting the Rapids." *Harvard Business Review*. 1985.

Wack, Pierre. "Uncharted Waters Ahead." *Harvard Business Review*. 1985.

Review the "Future Scenarios" webpage by Shell Oil.

Tegmark, Max. *Life 3.0: Being Human in the Age of Artificial Intelligence*. Knopf, 2017. *Chapter 5.*

Assignment:

In 200 words, articulate the differences between scenarios and predictions.

April 20 - Week 12 – Scenarios and Systems: Uncovering Assumptions via Fiction

Preparation:

Atwood, Margaret. Oryx and Crake. Anchor, 2004.
Forstchen, William. *One Second After*. Forge Books, 2009.

Assignment:

Come prepared to discuss the issues posed by the scenario you read.

April 27 - FINAL PRESENTATIONS

FINAL PAPER DUE MAY 8TH AT 5PM