This course employs scientific theories and innovations to understand complex processes that represent the most challenging policy dilemmas of the twentieth-first century: networks, epidemics/crisis management, land use/transport/cities, model validation, public policy, marketing, and the information economy. It explores the proposition that the frontiers of modern science can provide social scientists with a common set of thinking tools for observing and abstracting patterns of social behavior and ultimately for adapting policy mechanisms to address the wickedly hard questions of contemporary, global political economy.

When policy makers confront a complicated problem, they often ask "What do we do first?" or "what is the best solution?" But for problems that are not just complicated, but complex in nature, those are the wrong questions. These problems -- which include everything from state-building to peacemaking to consolidating democracy -- are created by networks of interacting agents influencing each other in a dynamic system. So one cannot isolate a first step from a second, or identify a single optimal solution -- one has to approach the entire landscape of interacting units as a complex system, and identify its feedbacks and interdependencies to understand the effects of different actions. Only then can one build a strategy that is sufficiently dynamic and adaptive to attain desired outcomes in a constantly changing environment. Without understanding the nature of complexity, policy makers will continue to fail -- as they have so often in the last few decades -- to make progress on crucial problems that develop from the dynamic interactions among actors within linked systems.

LEARNING OUTCOMES:
The course will enable students to become familiar with the analytical framework of complex adaptive systems and its application to global public policy. Students will acquire
new tools to understand the adaptive processes and possible discontinuities that will shape the emergent global order. Analysis of the military, political, economic and cultural interactions of both Western and non-western societies will illustrate and validate the complex systems approach, challenging conventional conceptions of what the state should do, and the ways in which it can act.

**COURSE REQUIREMENTS:**
Students are expected to keep up with each week’s required readings and to participate in class discussion.

20%: Class discussion and one class presentation of a title in the syllabus.
20%: Midterm Take Home: A set of questions will be emailed to the class from which students will select their topic and write an essay of 1,000 words.
60%: One term paper, 2,500 words due at the end of the semester or an agent-based model revealing a property of a complex social environment.

A) Write a 2,500-word essay in which you explore how the study of complexity can be applied to practical problems of global public policy. Demonstrate potential connections between theories of complexity and problems in global management, government or organizations. Students can choose topics in public health, environment, critical infrastructure, global security, cyber ware fare, demographic transitions As examples consider problems that are inadequately explained; can models of complexity can be applied to provide a more realistic understandings and better policies than conventional analytical tools? Devise experiments that can reveal laws or patterns that govern how complex institutions, organizations or technologies organizations evolve.

OR:

B) Computationally adept students can construct computer-based simulation models to analyze complex systems. Show how artificial worlds like Sugars cape can be created to capture relevant aspects of the global problems under consideration during the semester. Given all exogenous and endogenous factors, construct model economies that evolve over time so that different scenarios can be analyzed using the models as virtual testbeds for theory generation and exploration.

OR:

C) Using Douglass’s North article “Institutions” JEP 1991, as an example write an essay about the role of networks in long term economic change with implications for contemporary development policy.

**REQUIRED READING**


WEEK 1: June 5, 2018 June 7, 2018
Theme: Understanding Complex system
Topic 1: Introduction
Topic 2: What is Social Complexity: Building Blocks to examine global political economy and complexity

“Theories of complex social systems are tested on massive scales every day, when governments implement various policies that often involve substantial resources and ultimately have tremendous impacts on the lives of countless citizens” (Miller and Page 2007: 235). Scholars from many disciplines are applying perspectives from the study of dynamical systems to problems of global and international public policy. How will this affect some of the basic paradigms of governance, development policy, foreign policy and international relations?

Required reading
**Recommended:**
Social Complexity 1: Overview: via@YouTube (youtu.be/kkcGr3y70bk?via@youtube) This module will provide a quick overview to the application theory to the social sciences. See Complexity Academy@Complexityacad

**WEEK 2: June 12, 2018 – June 14, 2018**
*Theme: The Great Debate on the Role of the State and Economy*

**Topic 1: Keynes and Hayek**

**Topic 2: Is the Road to the Future Mechanistic or Organic?**

**WEEK 3: June 19, 2018 – June 21, 2018**
*Theme: The Economy as a Complex Adaptive System*

**Topic 1: Evolution, Complexity. And the Radical Remarking of Economics.**

**Topic 2: Evolution, Complexity. And the Radical Remarking of Economics**

OR

**WEEK 4: June 26, 2018 – June 28, 2018**
*Theme: Networks*

**Topic 1: How Everything Is Connected to Everything Else?**

**Topic 2: What It Means for Business, Science, and Everyday Life?**

**WEEK 5: July 3 (no classes), 2018 July 5, 2018**
*Theme: Global Finance*

**Topic 1: Economics, Crashes and Finance System**

**WEEK 6: July 10, 2018 July 12, 2018**  
**Theme: Cognition**  
**Topic 1: The Black Box of Economics**  
**Topic 2: Culture, Cognition and Social Evolution**

Hilton Root, Fast, slow and endless variation drives global development, Cambridge Review of International Affairs. Published online: 18 Oct 2016  

**WEEK 7: July 17, 2018 July 19, 2018**  
**Theme: Institutions and performance of nations**  
**Topic 1: Great transitions in economic history**  
**Topic 2: Large-scale Structure, Change and Universality in Historical Regimes**  

**WEEK 8: July 24, 2018**  
**Theme: Networks, Complexity and International Relations**  
**Required reading:**  
Antoine Bousquet and Simon Curtis (2011), Beyond models and metaphors: complexity theory, systems thinking and international relations, Cambridge Review of International Affairs , Volume 24, Number 1, March 2011

**Recommended reading:**  


