

Course Proposal for CSTC 2024-25

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Cybernetics, Complexity, Chaos and Critical Theory

Course Description: Cybernetics, complexity theory and chaos theory all emerged since the mid-twentieth century from scientific study of systems that exhibit dynamic behavior and are challenging to predict or control using linear methods. This course explores the intersections of these three thought-fields with critical theory and continental philosophy. Students will examine the philosophical foundations and implications of “the three C’s”, with a focus on understanding concepts of system, feedback, emergence, bifurcation, attractors, self-organization and catastrophe. Particular attention will be given to the points where cybernetics, complexity, and chaos thinking touch strands of critical social theory: examples include the role of heterodox Marxist Alexander Bogdanov as a precursor of systems thinking; the influence of cybernetics on Foucault, Deleuze and Guattari; the line of feminist cybernetics inaugurated by Donna Haraway; the relation of complexity theory to concepts of intersectionality; and the place of chaos and complexity theory in analysis of the “polycrisis” of contemporary capitalism and the search for radical alternatives.

Course Duration: 13 weeks

Week 1-2: Philosophy of Science and Systems Thinking

- Readings:
 1. Thomas Kuhn - *The Structure of Scientific Revolutions* (Selections)
 2. Ludwig von Bertalanffy - *General System Theory: Foundations, Development, Applications* (Selections)
 3. Francisco Varela et al. - "Autopoiesis: The Organization of Living Systems, Its Characterization and a Model"
 4. Alexander Bogdanov - *The Philosophy of Living Experience* (selections)

Week 3-4: Introduction to Cybernetics

- Readings:
 1. Norbert Wiener *Cybernetics: Or Control and Communication in the Animal and the Machine* (Selections)
 2. Heinz von Foerster - "Cybernetics of Cybernetics"
 3. Katherine Hayles - *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Selections)
 4. Gregory Bateson - *Steps to an Ecology of Mind* (selections)

Week 5-6: Critical Theory and Cybernetics

- Readings:
 1. Herbert Marcuse - *One-Dimensional Man* (Selections)
 2. Niklas Luhmann - *Social Systems* (Selections)
 3. Donna Haraway- "A Cyborg Manifesto"
 4. Vincent August "Network concepts in social theory: Foucault and cybernetics"

Week 7-8: Complexity Theory

- Readings:
 1. Stuart Kauffman - *At Home in the Universe: The Search for Laws of Self-Organization and Complexity* (Selection)
 2. Edgar Morin – *The Challenge of Complexity* (Selection)
 3. Ilya Prigogine and Isabelle Stengers *Order Out of Chaos: Man's New Dialogue with Nature* (Selections)

Week 9-10: Complexity, Emergence, and Philosophy

- Readings:
 1. Felix Guattari *Three Ecologies*; selections from Gilles Deleuze and Félix Guattari - *A Thousand Plateaus: Capitalism and Schizophrenia*
 2. Manuel DeLanda - *A New Philosophy of Society: Assemblage Theory and Social Complexity* (Selections)
 3. Karen Barad - *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Selections)
 4. Sylvia Walby "Complexity Theory, Systems Theory, and Multiple Intersecting Social Inequalities"

Week 11: Theories of Chaos and Catastrophe

- Readings:
 1. James Gleick - *Chaos: Making a New Science* (Selections)
 2. Michel Serres - *The Birth of Physic* (Selections)
 3. Vladimir I. Arnol'd *Catastrophe Theory* (Selections)
 4. David W. Bates "Unity, Plasticity, Catastrophe: Order and Pathology in the Cybernetic Era"

Week 12-13: Polycrisis?

- Readings:
- Adam Tooze “Defining polycrisis - from crisis pictures to the crisis matrix”.
- Ulrich Witt “Capitalism as a complex adaptive system and its growth”
- Kai Heron “Capitalist catastrophism and eco-apartheid”
- Aurora Apolito: “The Problem of Scale in Anarchism and the Case for Cyber-Communism”
- Rodrigo Nunes *Neither Vertical nor Horizontal: A Theory of Political Organization* (Selection)