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**Revised 1/29/20**

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**ECON 1818** **–** **THE ECONOMICS OF DISCONTINUOUS CHANGE – FAS Spring 2020**

**Requirements:**  Midyear, Final, Lectures, **Project**
**Grading:** ½ exams; ½ project. Consideration given to participation and extra weight given for outstanding paper.
**Readings:** The syllabus, with hyperlinks, will be posted to course website; most items have open-sourced hyperlinks.
**Readings:** “r” accessible thru ec1818 Canvas “reserves” site. Readings “gs” have links thru Harvard’s google scholar.

(Contact Jennifer@nber.org if you find broken links in the syllabus).

**INTRODUCTION**

 LECTURE 1: Introduction to Course: Discontinuity in Economic Analysis (Tues Jan 28)

1. SOCIAL INTERACTION MODELS

 LECTURE 2: Cellular Automata Models, Homophily, and Segregation (Thurs Jan 30)

LECTURE 3: PD Games, Tit-for-tat, and Ultimatum and Dictator Games (Tues Feb 4)

LECTURE 4: Evolutionary Stable and ZD Strategies (Thurs Feb 6)

2. STRATEGIES AND ALGORITHMS FOR FINDING OPTIMUM

LECTURE 5: Fitness Landscape models; Simulated Annealing; Genetic Algorithm (Tues Feb 11)

LECTURE 6: Economics/Math of Search and Dispersion of Prices/Wages (Thurs Feb 13)

LECTURE 7: Algorithms Beating Us in Complex Games: Reinforcement Learning (Tues Feb 18)

LECTURE 8: The Power of Markets Without Brains or Strategy: Minority Game (Thurs Feb 20)

3. NETWORKS AND POWER LAWS

LECTURE 9: Power Laws: Distribution of Size (Tues Feb 25)

LECTURE 10: Benford's Law: Distribution of Digits (Thurs Feb 27)

LECTURE 11: Random Graphs and Small Worlds (Tues Mar 3)

LECTURE 12: Network Models (Thurs Mar 5)

LECTURE 13: Networks in Science (Tue Mar 10)

SPRING BREAK: March 12-22 (no Class on Mar 12)

LECTURE 14: Financial Disasters and Econophysics (Tues Mar 24)

4. LARGE DATA SETS TO THE RESCUE?

LECTURE 15: Data Mining and Global Search Neural Net Models (Thurs Mar 26)

LECTURE 16: Tree Models, Rule-Based Models (Tues, Mar 31)
LECTURE 17: Real Time Analysis – Concept Drift; Voltagility (Thurs April 2)

LECTURE 18: Concentration of Measure / Fat Tails / Stats of Extremes (Tues April 7)

LECTURE 19: Meta-statistics: creating large data from many studies (Thurs April 9)

5. SMALL DATA SETS/SURVEYS TO THE RESCUE?

 LECTURE 20: Fuzzy Logic and Expert Systems (Tues April 14)

LECTURE 21: Case studies via QCA Boolean Models (Thurs April 16)

LECTURE 22: Wisdom of Crowds, futures markets (Tues April 21)

6. SIMULATIONS TO THE RESCUE?

 LECTURE 23: Systems Dynamics Models & Artificial Agent Models and Applications (Thurs April 23)

 IN-CLASS FINAL EXAM:

In-class exam focused on post take-home exam material (Tues, April 28).

RESEARCH PAPERS DUE: Friday May 8