

## AI 829 Social Simulations (3. 0)

**Pre-requisite:** None

**Recommended Books:**

- Introduction to Computational Social Science: Principles and Applications (2017), by Claudio Cioffi-Revilla, 2nd Ed. Springer
- Simulation for the Social Scientist (2005), by Nigel Gilbert, Klaus Troitzsch, 2nd Edition, OpenUniversity Press
- Monte Carlo Simulation and Resampling Methods for Social Science (2013), by Thomas Carsey, First Edition, SAGE Publications
- Interdisciplinary Applications of Agent-Based Social Simulation and Modeling (2014), by Diana Francisca Adamatti, Graçaliz Pereira Dimuro, Helder Coelho, 1st Edition, IGI Global
- Credit Hours:** 3 (3, 0)

**Course Objectives:**

On completion of the course, the student should be able to answer:

- research. When agent-based models are most fruitfully applied,
- How to construct a conceptual agent-based model and then formalize it,
- How to implement the formalized model as custom computer software in Netlogo,
- How to use the Netlogo programs to carry out simulation experiments that will produce scientifically defensible assertions
- A broad range of applications of ABM in contemporary sociology

<b>Topics / Contents</b>	<b>Allocated Periods</b>
<p>In this course we will learn how artificial societies can be specified (agent-based modeling) and then made to exist and evolve in time (computer simulation). The techniques of modeling and simulation provide a systematic way to state and test hypotheses about the microscopic mechanisms (e.g. individual behaviors) that might plausibly be responsible for the emergence of observed macroscopic systemic social patterns. Primary contents covered in the course will constitute to answer (i) when agent-based models are most fruitfully applied (ii) how to construct a conceptual agent-based model and then formalize it, (iii) how to implement the formalized model as custom computer software in Netlogo, and (iv) how to use the Netlogo programs to carry out simulation experiments that will produce scientifically defensible assertions. To achieve all this, the course will begin with a few "toy examples", and then a series of research papers in sociology (and the social sciences more broadly) in which agent-based modeling and simulation has played a central role. For each of these papers, the nature of the question would be dissected, the agent-based model, the simulation, the experiments, and the conclusions -- whenever possible, would be attempted to re-create the results using hands-on (computer) laboratory experiments. In the course students will gain an appreciation for the importance of agent-based simulation in sociology research, and begin to become</p>	<b>45</b>

<p>empowered to create their own models and apply simulation techniques towards sociological research questions of interest to us. Agent-based Modelling and Simulation in the Social and Human Sciences (2007), by Denis Phan , Frederic Amblard, The Bardwell Press</p>	
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