Agent-Based Modeling (ABM) for Social Systems Training Course

Professional Development Training Course Outline

Category	Research and Data Analysis	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

In today’s increasingly complex and interconnected world, traditional modeling techniques often fail to capture the dynamic interactions within social systems. Agent-Based Modeling (ABM) offers a revolutionary approach to simulating individual-level behaviors and their collective effects. Agent-Based Modeling (ABM) for Social Systems Training Course equips participants with the skills to model, analyze, and visualize complex social systems through computational simulations, providing deep insights into social phenomena such as cooperation, conflict, migration, public health dynamics, and market behavior.

Designed for both beginners and professionals, this course blends theoretical concepts with hands-on applications using powerful ABM tools like NetLogo, Repast, and AnyLogic. Participants will learn to construct rule-based agents, simulate real-world scenarios, and apply ABM to interdisciplinary fields including economics, epidemiology, urban planning, sociology, and political science. By the end of this course, you will be ready to develop your own agent-based models for research, policy analysis, or organizational planning.

Programme Curriculum

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Course Objectives

1. Understand the fundamentals of agent-based modeling and simulation.
2. Define and implement rules for autonomous agents.
3. Use NetLogo and Repast for practical ABM applications.
4. Analyze emergent behavior in complex social systems.
5. Design interactive simulation models to test hypotheses.
6. Apply ABM to epidemiology, economics, and urban development.
7. Integrate big data with ABM for real-time simulation.
8. Develop models for behavioral and social dynamics.
9. Validate and verify models using scientific methods.
10. Communicate model outcomes using data visualization tools.
11. Explore policy-making simulations and scenario testing.
12. Learn sensitivity analysis and parameter calibration techniques.
13. Create custom ABMs using Python and Java-based environments.

Target Audience

1. Social science researchers
2. Urban planners and public policy analysts
3. Public health professionals and epidemiologists
4. Economists and behavioral scientists
5. Academic faculty and graduate students
6. AI and machine learning practitioners
7. Data scientists and system modelers
8. NGO and development agency professionals

Course Duration: 5 days

Course Modules

Module 1: Introduction to Agent-Based Modeling

- Overview of ABM and its relevance
- Key concepts: agents, environments, rules
- Differences between ABM and traditional models
- ABM in computational social science
- Introduction to modeling platforms
- **Case Study**: Modeling social segregation with Schelling’s model

Module 2: Designing Intelligent Agents

- Defining agent attributes and behaviors
- Rule creation and decision-making logic
- Implementing agent-environment interaction
- Agent learning and memory mechanisms
- Visualizing agent interactions
- **Case Study**: Modeling consumer behavior in a retail setting

Module 3: Tools for ABM – NetLogo and Repast

- Installing and navigating NetLogo
- Coding agents and environments in NetLogo
- Introduction to Repast Simphony framework
- Running simulations and collecting data
- Comparing modeling platforms
- **Case Study**: Epidemic spread simulation using NetLogo

Module 4: Social Dynamics and Emergent Phenomena

- Understanding emergence in ABM
- Modeling cooperation and competition
- Group behavior and social influence
- Cultural transmission and norm evolution
- Simulation of social networks
- **Case Study**: Modeling rumor spread in online communities

Module 5: ABM in Economics and Markets

- Simulating market transactions and dynamics
- Agent strategies in economic models
- Behavioral economics via ABM
- Predicting economic trends with ABM
- Integrating real data in economic simulations
- **Case Study**: Modeling financial market crashes

Module 6: Public Health and Epidemiological Modeling

- ABM in disease modeling and control strategies
- Incorporating demographic and mobility data
- Vaccination strategies and herd immunity
- Health behavior simulations
- Response modeling to public health interventions
- **Case Study**: COVID-19 ABM simulation and policy impact

Module 7: Urban Planning and Smart Cities

- Modeling traffic flow and public transportation
- Land use and population distribution modeling
- Smart city simulations with real-time data
- Environmental impact analysis
- Infrastructure stress modeling
- **Case Study**: Simulating pedestrian movement in urban spaces

Module 8: Verification, Validation & Policy Simulation

- Methods for model verification
- Calibration and parameter sensitivity
- Validating models against real data
- Scenario testing for decision-making
- Communicating results to stakeholders
- **Case Study**: Policy scenario testing for migration patterns

Training Methodology

- Hands-on coding workshops using NetLogo and Repast

- Guided simulation exercises with real-world data
- Interactive group discussions and Q&A sessions
- Modeling assignments and feedback reviews
- Case study walkthroughs with live demonstrations
- Project-based learning with personalized mentorship

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com