Week 1: Introduction to Agent and System-based Modeling

- Understand the basic concepts of agent-based and system-based modeling.
- Explore the advantages and applications of these modeling approaches.
- Familiarize yourself with Machinations.io or AnyLogic user interface.

Week 2: Getting Started with Machinations.io or AnyLogic

- Install and set up Machinations.io or AnyLogic.
- Learn the basic functionalities and features of the tool.
- Create a simple model to simulate a basic system.

Week 3: Elements of Agent-based Modeling

- Understand the key elements of agent-based modeling: agents, attributes, and behaviors.
- Create agents with different attributes and define their behaviors.
- Simulate simple interactions between agents using Machinations.io or AnyLogic.

Week 4: System Dynamics Modeling

- Explore system dynamics modeling concepts and techniques.
- Create stock and flow diagrams to represent dynamic systems.
- Simulate feedback loops and understand their impact on system behavior.

Week 5: Model Visualization and Analysis

- Learn how to effectively visualize and analyze model outputs.
- Use various visualization techniques to present simulation results.
- Perform statistical analysis on simulation data.

Week 6: Model Calibration and Validation

- Understand the importance of model calibration and validation.
- Learn techniques for calibrating and validating agent-based models.
- Apply calibration and validation methods to your own model.

Week 7: Scenario Development and Analysis

- Learn how to develop scenarios for simulation models.
- Explore techniques for scenario analysis and comparison.
- Use Machinations.io or AnyLogic to simulate and analyze different scenarios.

Week 8: Sensitivity Analysis and Optimization

- Perform sensitivity analysis to assess the impact of input parameters on model outputs.

- Learn optimization techniques to improve system performance.
- Apply sensitivity analysis and optimization methods to your model using the tool.

Week 9: Advanced Modeling Techniques
- Explore advanced modeling techniques, such as agent-based modeling with machine learning.
- Learn how to integrate machine learning algorithms into your agent-based models.
- Apply machine learning techniques to enhance the decision-making capabilities of agents.

Week 10: Simulation Experiments and Data Collection
- Design and conduct simulation experiments using Machinations.io or AnyLogic.
- Collect data from simulation runs for analysis and comparison.
- Understand the best practices for conducting meaningful simulation experiments.

Week 11: Scenario Analytics and Decision Support
- Use scenario analytics techniques to gain insights from simulation results.
- Apply decision support methods to inform decision-making based on simulation outputs.
- Use Machinations.io or AnyLogic to support decision-making processes.

Week 12: Model Documentation and Reporting
- Understand the importance of model documentation.
- Learn how to document and report your agent and system-based models.
- Present your model and findings in a clear and concise manner.

Week 13-16: Project Work and Analysis
- Work on a substantial project using Machinations.io or AnyLogic to develop and analyze a complex simulation model.
- Apply scenario analytics to explore different what-if scenarios and evaluate their impact.
- Analyze and interpret the simulation results to derive meaningful insights.

Week 17: Project Presentation and Feedback
- Present your project to the class or peers.
- Receive feedback and suggestions for further improvement.

Week 18: Wrap-up and Reflection

- Reflect on your learning journey and the skills acquired.
- Review the key concepts and techniques covered throughout the curriculum.
- Identify areas for further exploration and self-directed learning.