DRAFT: Syllabus, Spring 2016, for OIDD 325: Thinking with Models

3:00–4:20 M & W, ***TBA***

Canvas: ***TBA***

Professor Steven O. Kimbrough, Instructor
Office hours: 565 JMHH, 9:30–11:00 and 1:30–3:00 Wednesdays, and by appointment

October 2, 2016

1 Class Description

2 Texts and Software

- NetLogo. Free download from `http://ccl.northwestern.edu/netlogo/`.
- *NetLogo User Manual* (comes with NetLogo)
- *An Introduction to Agent-Based Modeling* (Wilensky and Rand, 2015).
- Other readings and handouts to include:
  1. Bankes (1993)
  2. Bankes et al. (2002)
  3. Weisberg (2013, chapters 1 and 2)
  4. See readings from fall 2014.

3 Grades

4 Class Schedule

1. Introduction and overview of the course.

   Reading (before class): (Wilensky and Rand, 2015, chapter 0), "Why Agent-Based Modeling."

   ***** Instructor Notes: Overview of the class. SAIL philosophy. Initial discussion of what modeling is about and the three distinctions: parametric versus strategic, insight versus decision, and description versus exploration. We are largely: parametric, insight, exploration. NetLogo: about, examples. Installing NetLogo. Note that we will focus on programming NetLogo at the start, then move on to other matters to do with modeling once you have this under your belts. What next. Should we do the initial exercises? Probably reserve that for next time. *****

2. Getting started with ABM.

   Reading (before class): (Wilensky and Rand, 2015, chapter 1), "Why Agent-Based Modeling" and from the *NetLogo User Manual*

   - Learning NetLogo
     - Tutorial #1: Models

   ***** Instructor Notes: We want to make this a prototypical class, I think. Begin with Q&A and perhaps a 20 minute lecture/overview of the material for the day. Then onto SAILing. Perhaps both some NetLogo exercises (the first, very simple ones) and also some small group exercises, to be written down and handed in? Roughly: 20 minutes lecture, 30 minutes NetLogo exercises, 30 minutes small group exercises? *****

3. Simple ABMs: Life.

   Reading (before class): (Wilensky and Rand, 2015, chapter 2, pages 45–68), "Creating Simple Agent-Based Models" and from the *NetLogo User Manual*

   - Learning NetLogo
     - Tutorial #2: Commands
     - Tutorial #3: Procedures

4. Simple ABMs: Heros and Cowards.

   Reading (before class): (Wilensky and Rand, 2015, chapter 2, pages 68–87), "Creating Simple Agent-Based Models".

5. Simple ABMs: Simple Economy.

   Reading (before class): (Wilensky and Rand, 2015, chapter 2, pages 87–99), "Creating Simple Agent-Based Models".

   ***** Instructor Notes: Up through this class things are pretty much slow and easy. The in-class exercises will be key to success. They should include both programming and small group exercises. *****

6. NetLogo as a Conventional Programming Lanuage.

   Reading (before class): The Info tab of the Conventional Programming 1 NetLogo model, found on the Modeling Commons (`modelingcommons.org`, search "kimbrough").

   ***** Instructor Notes: Have in mind a longer lecture, maybe 30–40 minutes, with examples, then programming exercises. *****

7. Exploring and Extending Agent-Based Models, 1.

   Reading (before class): (Wilensky and Rand, 2015, chapter 3, pages 101–128), "Exploring and Extending Agent-Based Models".

   ***** Instructor Notes: Cover the Fire model and the DLA model briefly in class, along with key programming material, then set them to work on (a) programming exercises and (b) small group exercises. *****

8. Exploring and Extending Agent-Based Models, 2.

   Reading (before class): (Wilensky and Rand, 2015, chapter 3, pages 128–153), "Exploring and Extending Agent-Based Models".

   ***** Instructor Notes: Cover the Segregation model and the El Farol model briefly in class, along with key programming material, then set them to work on (a) programming exercises and (b) small group exercises. *****

9. Creating Agent-Based Models, 1.

   Reading (before class): (Wilensky and Rand, 2015, chapter 4, pages 157–189), "Creating Agent-Based Models".

   ***** Instructor Notes: Cover the readings briefly in class, along with key programming material, then set them to work on (a) programming exercises and (b) small group exercises. *****

10. Creating Agent-Based Models, 2.

    Reading (before class): (Wilensky and Rand, 2015, chapter 4, pages 189–197), "Creating Agent-Based Models".

    ***** Instructor Notes: Cover the readings briefly in class, along with key programming material. Also lecture and/or have a reading on multiple runs/solution pluralism. Then set them to work on (a) programming exercises and (b) small group exercises. *****

11. Chapter 5, part 1
12. Chapter 5, part 2
13. Chapter 6, part 1
14. Chapter 6, part 2
15. Chapter 7, part 1
16. Chapter 7, part 2
17. And then . . . ??

Small group assignment hand-ins due: 5 p.m. Sunday, May 1, 2016.

Small group hand-ins.

5 Calendar, Spring 2016

Reading days: April 28–9, 2016. Final examinations: May 2–10, 2016.

	0	1	2
0	—	W: 2016-02-17	W: 2016-03-30
1	W: 2016-01-13	M: 2016-02-22	M: 2016-04-04
2	W: 2016-01-20	W: 2016-02-24	W: 2016-04-06
3	M: 2016-01-25	M: 2016-02-29	M: 2016-04-11
4	W: 2016-01-27	W: 2016-03-02	W: 2016-04-13
5	M: 2016-02-01	M: 2016-03-14	M: 2016-04-18
6	W: 2016-02-03	W: 2016-03-16	W: 2016-04-20
7	M: 2016-02-08	M: 2016-03-21	M: 2016-04-25
8	W: 2016-02-10	W: 2016-03-23	W: 2016-04-27
9	M: 2016-02-15	M: 2016-03-28	—

Table 1: Class number :: date correlation, for Monday (M) and Wednesday (W) classes, spring 2016.

References

Bankes, S. (1993). Exploratory modeling for policy analysis. *Operations Research*, 41(3):435–449.

Bankes, S., Lempert, R., and Popper, S. (2002). Making computational social science effective. *Social Science Computer Review*, 20(4):377–388.

Weisberg, M. (2013). *Simulation and Similarity: Using Models to Understand the World*. Oxford University Press, Oxford, UK.

Wilensky, U. and Rand, W. (2015). *An Introduction to Agent-Based Modeling*. The MIT Press, Cambridge, MA.

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