Summary

This course will provide a rigorous introduction to learning and evolution in games. It will be divided into three parts:

(1) Concepts and mathematical techniques for studying population games and evolutionary dynamics.

(2) Applications of evolutionary game theory.

(3) Exploring new applications of evolutionary game theory. Students should be able to begin writing an original paper using these tools by the end of the course.

Textbooks

The following two textbooks are essential reading for mastery of the subject:


A less advanced treatment is provided by:


My lecture notes will draw on all three texts. The lectures/presentations in weeks 7-11 will be based on published articles.

Course Outline (indicative, subject to change):

Theory

Week 1. Foundations of Evolution and Learning in Games (Y: 1-2, 5; S: 1)

Week 2. Population Games (S: 2-3, Y: 4)

Week 3. Revision Protocols and Evolutionary Dynamics (W: 3; S: 4-6)

Week 4. Global Convergence (Y: 7; S: 7)

Weeks 5. Local Stability and Nonconvergence (Y: 7, S: 8-9)

Week 6. Stochastic Dynamics and Infinite-Horizon Analysis, Stochastic Stability (Y: 3-4; S: 10-12)
Weeks 7. Stochastic Stability in Bargaining and Coordination Games (Y: 4,8-9)

Applications

Week 8. Evolution of Norms & Customs and Technology Adoption (Y: 8-9)
Week 9. Cultural Evolution
Weeks 10. Local Interaction on Networks (Y: 6)

Exams and Grading Policy

The final grade for the course will be determined as follows:

- Class participation: 5%
- Existing research paper presentation*: 15%
- Research project proposal**: 20%
- Final Exam (according to schedule): 60%

* A reading list will be issued in the first class for weeks 8-10. Each student will present one of these papers.

** In addition, students will submit an original research proposal drawing upon the techniques and concepts learned during the course.

Please note that there will be NO MAKE-UP FINAL EXAM.

Contact info

My office hours are held on Wednesdays from 4-6 pm in SSPA 3117. My e-mail address is jpcarv (at) uci.edu.