ECE4563 Course Syllabus

ECE4563

Game Theory and Multiagent Systems (3-0-3)

Prerequisites

(ECE 2040 [min C] or ECE 3710 or ISYE 3133) and (CEE/ISYE 3770 or MATH 3670 or ISYE 2027)

Corequisites

None

Catalog Description

An introduction to game theory and its application to multiagent systems, including distributed routing, multivehicle control, and networked systems.

Textbook(s)

M.J. Osborne, *An Introduction to Game Theory* (1st edition), Oxford University Press, 2004. ISBN 0195128958, ISBN 978-0195128956 (required)

Course Outcomes

Upon successful completion of this course, students should be able to:

1. understand the notion of an agent.
2. discuss the key issues associated with constructing agents, building and implementing models.
3. understand the types of game theoretic interactions possible in multiagent systems.
4. be familiar with the main engineering application areas of multiagent systems.
5. most importantly, be able to design meaningful agent-based systems.

Topical Outline

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Game theory:
   - Pure strategy Nash equilibrium
   - Rationalizability and dominance
   - Probability review
   - Expected utility
   - Mixed strategy Nash equilibrium
   - Zero sum games
   - Bayesian games & imperfect information
   - Extensive form games
   - Repeated games
   - Bargaining

Multagent systems:
   - Coordination games
   - Markov chains
   - Distributed optimization
   - Strategic learning
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