Course Number	CS 538	Course Title	Game Theory in Networks
Semester Hours	3	Course Coordinator	Henry Hexmoor
Catalog Description	Game theoretic concepts apply whenever actions of several players are interdependent. This course will provide an introduction to classic game theory and strategic thinking including dominance, Nash equilibrium, and stability. Social choice, social learning, and online mechanism design are then discussed. We will examine how game theoretic concepts can be used in developing reasoning strategies, i.e., algorithms. Application of game theoretic framework to telecommunication and human networks is an integral part of this course.		

Textbooks

SP20

Nisan, N., et. al. (2007). *Algorithmic Game Theory*, Cambridge University Press. ISBN: 9780521872829.

References

Course Learning Outcomes

- An understanding of game theory as strategic reasoning.
- Development of problem analysis skills to incorporate game theory.
- The skills to design a game as a novel treatment for existing computer science problems.

Assessment of the Contribution to Student Outcomes

Outcome →	1	2	3	4	5	6	7
Assessed →	X	X	X	X		X	X

Prerequisites by Topic

Graduate standing or consent of instructor.

Major Topics Covered in the Course

Course Outline:	**Lectures**
Fundamentals of Game theory	28
Decision Theory, Utilities	4
Normal and Extensive Forms	4
Evolutionary Game Theory	2
Bayesian and Stochastic Games	2
Coordination: Coordination Games and Common Knowledge	2
Coalitions and Cooperative Games	4
Learning: Social/Economic models	4
Communication Networks	2
Mechanism Design: Social Choice and MD	2
Online Mechanisms	2
Engineering Applications	12
Graphical Games	2
Cryptography and Security	2
Wireless Networks	2
Optical and P2P Networks	2
Social Networks	2
Network Security	2
Total	**40 hours**