



University of Tehran
School of Electrical and Computer Engineering

Course:	8101949 –Game Theory									
Course type:	EE*						CE*			Credit: 1
	Com	E	P	B	Con	D	SW	HW	IT	
	Required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Elective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Level:	Undergraduate <input type="checkbox"/> Graduate <input checked="" type="checkbox"/>									
Co-requisite(s):	None.									
Prerequisite(s):	None.									
Prerequisite by topic:	Optimization									
Textbook(s):	<p>[1] Fudenberg D., Tirole J., Game Theory , MIT Press, Cambridge, Massachusetts, 1991.</p> <p>[2] Martin J. Osborne and Ariel Rubinstein, A course in game theory, MIT Press, 1994.</p> <p>[3] Basar, T., Olsder, G. J., Dynamic non-cooperative game theory, Second Edition, SIAM, 1999.</p> <p>[4] D. Fudenberg, Levine D., The theory of learning in games, MIT Press, Cambridge, Massachusetts, 1998.</p> <p>[5] Jorgen W. Weibull, Evolutionary Game Theory, MIT Press, 1995.</p> <p>[6] Ross Cressman, Evolutionary Dynamics and Extensive Form Games, MIT Press, Cambridge, Massachusetts, 2003.</p> <p>[7] Z. Han, D. Niyato, W. Saad, T. Basar, and A. Hjørungnes, Game Theory in Wireless and Communication Networks: Theory, Models, and Applications, Cambridge University Press 2011.</p> <p>[8] Menache I., Ozdaglar A., Network Games, Theory, Models, and Dynamics, SYNTHESIS LECTURES ON COMMUNICATION NETWORKS, 2011.</p> <p>[9] Ozdaglar A., Game Theory with Engineering Applications, MIT Course Online 2010.</p> <p>[10] Yoav Shoham, Kevin Leyton-Brown, MULTIAGENT SYSTEMS Algorithmic, Game-Theoretic, and Logical Foundations</p>									
Coordinator:	Kebriaei									
Goals:	This course is an introduction to the fundamentals of game theory and its applications. The course is generally about multi agent/player decision making. Motivations are drawn from engineered/networked systems, including: distributed control of multi agent systems, wireless communication networks, smart grids, markets and social and economic									

	networks. The course emphasizes theoretical foundations, mathematical tools, modeling, and equilibrium notions in different environments.						
Outcome:	Upon successful completion of the course, students will be able to <ol style="list-style-type: none"> 1. Understand basic principles of game, strategy and equilibrium 2. Apply game theoretic framework to an engineering problem 3. Get familiar with strategic games and strategic form of the game 4. Get familiar with dynamic non-cooperative game theory 5. Get familiar with learning in games and evolutionary game theory 						
Topics:	<ol style="list-style-type: none"> 1) Introduction, Basic definitions (game, strategy, equilibrium ...) 2) Strategic games and strategic form of the game. 3) Coalitional and Cooperative games 4) Complete information repeated games 5) Repeated games of incomplete information (Expectations and Stability) 6) Dynamic non-cooperative game theory. 7) Evolutionary game theory 8) Learning in Games 9) Bayesian Games 10) Markov games (Stochastic Games) 11) Mechanism Design 12) Mean field Game 13) Applications in Control, Power systems and Communication Networks, Smart Grids ... 						
Computer usage:	MATLAB						
Assignments:	4 to 6 homework assignments						
Projects:	None.						
Grading:	<table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">Assignments:</td> <td style="text-align: right;">25 %</td> </tr> <tr> <td>Midterm exams:</td> <td style="text-align: right;">40 %</td> </tr> <tr> <td>Final exam:</td> <td style="text-align: right;">35 %</td> </tr> </table>	Assignments:	25 %	Midterm exams:	40 %	Final exam:	35 %
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Further readings:							
Prepared by:	Kebriaei						
Date:	23 August 2017						

*EE: Electrical Engineering		CE: Computer Engineering	
Com	Communications	SW	Software
E	Electronics	HW	Hardware
P	Power	IT	Information Technology
B	Bioelectronics		
Con	Control		
D	Digital System		