MANIPAL UNIVERSITY JAIPUR

Winter School

Name of course: Game Theory in Fuzzy Environment

Name of Instructor: Prof Kalpna Sharma and Dr. Vidyottama Jain (Central University, Rajasthan)
Language of instruction: English
Number of contact hours: 36
Credit awarded: 03

Objective of course: Game Theory is inherently uncertain. To tackle the uncertainty in Games, we may use the notion of fuzzy set theory. This course presents a systematic and focused study of the application of fuzzy sets to matrix game theory. It has been divided into three parts, in the first part, two person zero sum game and its relation with a primal-dual pair of linear programming problems are elaborated, the second part provides an understanding of the basic mathematical elements of the theory of fuzzy sets, and at last, this course provides a review of the recent literature on fuzzy matrix games. The main objective of this course is to establish thorough background knowledge on fuzzy matrix games in post graduate students and enable them to pursue individual research in solving such games in real world scenario.

Syllabus
Linear Programming, Duality, Two person zero sum games; fuzzy sets and their properties, fuzzy numbers, generalization of fuzzy sets, fuzzy numbers; application of fuzzy sets to two person zero sum games.

Organization of course

Total contact hrs 36		
1st week:	10 hrs (classes)	2 hrs (self-study/project)
2nd week:	10 hrs (classes)	2hrs (Mid term Exam / assessment/discussion)
3rd week:	10 hrs (classes)	2 hrs (End term exam)

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Mode of lectures: online lecture/online videos/case study/ discussion/ workshop/ hands-on

Course Plan

Lecture no.	Topic	Lecture mode	Instructor
L: 1-6	Linear Programming Problems, Duality,	Online Lecture and Online videos	Prof. Kalpna Sharma
L: 7-12	Two Person Zero Sum Games,	Online Lecture and online video	Prof. Kalpna Sharma and Dr. Vidyottama Jain
L: 13-18	Fuzzy sets and their properties, Fuzzy numbers and its types, Generalization of fuzzy sets,	Online Lecture and online video	Dr. Vidyottama Jain
L: 19-24	Application of fuzzy sets to two person zero sum games: A literature review	Discussions	Prof. Kalpna Sharma and Dr. Vidyottama Jain
L: 25-30	Application of fuzzy sets to two person zero sum games: Proposal of a research problem.	Discussions	Prof. Kalpna Sharma and Dr. Vidyottama Jain

Brief profiles of the instructors:

Prof. Kalpna Sharma

She earned her Ph.D. degree from Rajasthan University. Currently , she is HoD , Department of mathematics & Statistics. Her specialization includes fluid Dynamics, Heat Transfer and mass transfer, Optimization and Game Theory

Dr. Vidyottama Jain

Dr. Vidyottama Jain

She earned her Ph.D. degree from Indian Institute of Technology Delhi. She was a postdoctoral fellow at BISC, University of California Berkeley, USA from 2009 to 2012. Presently, she is with the Department of Mathematics, Central University of Rajasthan, India. Her specialization includes fuzzy optimization, fuzzy game theory, decision making under risk and uncertainty, wireless networks and applications of game theory to telecommunication systems.