GAME THEORY

PROF. K. S. MALLIKARJUNA RAO
Industrial Engineering and Operations Research
IIT Bombay

TYPE OF COURSE : Rerun I Elective I UG
COURSE DURATION : 8 weeks (26 Jul'21 - 17 Sep'21)
EXAM DATE : 26 Sep 2021

PRE-REQUISITES : Calculus, Linear Algebra & Probability
INTENDED AUDIENCE : Maths/CS/Econ/EE/Management

COURSE OUTLINE:
Game theory models conflict and cooperation between decision makers who are assumed to be rational. It has applications in multiple disciplines and areas. The aim of this course is to introduce the following topics at a basic level: combinatorial games, zero-sum games, non-zero sum games and cooperative games. Learning outcomes for the course: At the end of the course, the student should be able to • Model and analyse conflicting situations using game theory.

ABOUT INSTRUCTOR:
After obtaining his Ph.D from IISc Bengaluru, Prof. K.S. Mallikarjuna Rao has spent few years at Centre de Mathematique et Informatique, Marseille, France; Indian Statistical Institute Delhi, University of Texas at Dallas, USA; and at TIFR Bengaluru as a postdoctoral fellow. He joined IEOR, IIT Bombay in 2007, where he is currently Associate Professor. His research interests include probability, game theory, optimization and stochastic control.

COURSE PLAN:
Week 1: Combinatorial games: Introduction, Examples, Game of Nim
Week 2: Combinatorial games: Impartial games, Hex game, Brouwer Theorem
Week 3,4: Zero-sum games
Week 5,6: Non-zero sum games
Week 7,8: Cooperative games